#### **VOLUME II-A**

#### APPENDIX G ENERGY CALCULATIONS

# FEASIBILITY STUDY FOR INSTALLATION OF UMCS FORT RILEY, KANSAS

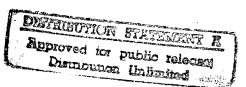
#### **ENERGY ENGINEERING ANALYSIS PROGRAM (EEAP)**

Prepared for

U.S. Army Corps of Engineers Kansas City District Kansas City, Missouri

Under

U.S. Army Engineer District, Mobile Indefinite Delivery A-E Contract Contract No. DACA01-94-D-0033 Delivery Order 0001 EMC No. 1406-001 19971017 065



December 1995

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By

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Marie Wakeffeld,

Librarian Engineering

## BUILDING 3 POST CHAPEL

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0003	BUILDING NAME:	POST CHAPEL

Building UA: 2,020

CONDITIONED SQFT: 4,340

#### SYTEM INFORMATION ....

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
	9 SANDSTONE BLOCK	CHURCH	0700-1800	M-F; SAT-SUN
Weeks of	f Winter: 32			
Weeks of S	Summer: 20	<del> </del>		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	4,800
%QA:	15%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,160	3,360
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760
CLG HRS SAVED:	2,200	-
HTG HRS SAVED:	3,520	
C/H HRS SAVED:	5,736	

CONSTANTS	
HOAUHC:	16.4
HOAUH:	26.4
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	44.1
нолон:	70.9
COAOHC:	0.00145
COAOC:	0.00384
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000312
ECHC:	0.000118
NSUCHC:	0.000139
NSUCC:	0.000369
DDCCHC:	0.000229
DDCCC:	0.000607
NSC:	53200
DDCH:	46300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 0003 BUILDING NAME: POST CHAPEL

				O						

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

<u>FUNCTION</u>	<u>kWlyr</u>	kWh/yr	MBtu/yr MH/	<u>yr</u>
Schedule ST/SP	0.00	2,725.94	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.52	0.00	0.00	
Night Setback	0.00	3,896.64	0.00	
Sub Total	0.52	6,829.42	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,379.78	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,			:	3.00
Maintenance, Run Time, and Safety Alarms		:		
TOTAL	0.52	10,209.20	0.00	3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #:** DACA 01-94-D-0033

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

**ENERGY CALCULATION PARAMETERS** 

BLDG:	0003	<b>BUILDING NAME:</b>	POST CHAPEL

Building UA: 2,020 CONDITIONED SQFT: 4,340

#### SYTEM INFORMATION ...

System Type: 16

System Name: Heating and Ventilating Unit

System Number: AHU-2

# Catagory Number: Construction:

 Catagory Number:
 Construction:
 Use:
 Occupancy HRS:
 Occupancy Days:

 9 SANDSTONE BLOCK
 CHURCH
 0700-1800
 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

#### INPUTS Motor HP: 3.00 HP Effic: 0.79 Load Factor: 0.80 5,000 CFM-HTG: CFM-CLG: 0 %OA: 15% %Area: 100% CHILLER CAP (TONS): 0 0.00 KW-TON: BLR CAP INPUT (BTUH): 0 BLR CAP OUTPUT (BTUH): 0

#### **HOURS CALCULATIONS**

		PRESENT HR/YR
CLG HRS ON:	1,160	3,360
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760
CLG HRS SAVED:	2,200	-
HTG HRS SAVED:	3,520	
C/H HRS SAVED:	5,736	

<u>CONSTANTS</u>	
HOAUHC:	16.4
HOAUH:	26.4
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	44.1
НОАОН:	70.9
COAOHC:	0.00145
COAOC:	0.00384
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000312
ECHC:	0.000118
NSUCHC:	0.000139
NSUCC:	0.000369
DDCCHC:	0.000229
DDCCC:	0.000607
NSC:	53200
DDCH:	46300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 0003

BUILDING NAME: POST CHAPEL

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit
System Number: AHU-2

FUNCTION	<u>kWlyr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	7,977.48	69.70	1
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	107.46	
Sub Total	0.00	8,668.71	177.16	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	93.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			:	3.00
TOTAL	0.00	8,668.71	270.69	, 3.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	ARY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
	TOTAL	1	2	0		\$1,433.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 09-Dec-95

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0003	BUILDING	NAME: POST CHAPEL	
Building UA:	2,020	CONDITIONED SQFT:	4,340

#### SYTEM INFORMATION

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	9 SANDSTONE BLOCK	CHURCH	0700-1800	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

9006-908860 ** \$12222 x 3.05 y 5.050 x **********************************	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	. 0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	. 8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

0.00
0.00
0.80
0
0
0%
0%
0
0.00
750,000
600,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760
CLG HRS SAVED:	2,200	]
HTG HRS SAVED:	3,520	-  -  -
C/H HRS SAVED:	5,736	

CONSTANTS	
HOAUHC:	16.4
HOAUH:	26.4
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	44.1
HOAOH:	70.9
COAOHC:	0.00145
COAOC:	0.00384
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000312
ECHC:	0.000118
NSUCHC:	0.000139
NSUCC:	0.000369
DDCCHC:	0.000229
DDCCC:	0.000607
NSC:	53200
DDCH:	46300
OPT:	305
CHWR:	17.5
CNWR:	C
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #**: DACA 01-94-D-0033

DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 0003 BUILDING NAME: POST CHAPEL

ENERGY CALCULATION SUMMARY

System Type: System Name:

Small steam boiler

System Number: BLR-1

FUNCTION :	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	The state of the s
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				4.00
Maintenance, Run Time, and Safety Alarms			;	
TOTAL	0.00	0.00	0.00	4.0

ÚMCS FUNCT		M POINT A	ND COS'	TSUMMA Di	RY AI	COST
; <b>NO.</b> 7		POINTS 1	<b>POINTS</b> 0	POINTS 3	POINTS 1	\$1,015.00
	TOTAL:	1	.0	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0003	BUILDIN	G NAME: POST CHAPEL	
	Building UA:	2,020	CONDITIONED SQFT:	4,340

## SYTEM INFORMATION

System Type: 26
System Name: Pump
System Number: CT-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	9 SANDSTONE BLOCK	CHURCH	0700-1800	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,160	3,360
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760
CLG HRS SAVED:	2,200	ì
HTG HRS SAVED:	3,520	).
C/H HRS SAVED:	5,736	5

CONSTANTS	4.00
HOAUHC:	16.4
HOAUH:	26.4
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	44.1
HOAOH:	70.9
COAOHC:	0.00145
COAOC:	0.00384
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000312
ECHC:	0.000118
NSUCHC:	0.000139
NSUCC:	0.000369
DDCCHC:	0.000229
DDCCC:	0.000607
NSC:	53200
DDCH:	46300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 0003 BUILDING NAME: POST CHAPEL
ENERGY CALCULATION SUMMARY

System Type: 26
System Name: Pump
System Number: CT-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,661.41	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	3,030.37	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time,			,	3.00
and Safety Alarms TOTAL	0.00	3,030.37	0.00	" 3.00

MCS NCTN	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
NO. 24	Scheduled start/stop control -	FOINTS	0	1		\$386.00
24	Pump; Optimum start/stop - Pump; Demand limiting - Pump	'	Ü	•	Ŭ	Ψ000.00

## BUILDING 6 POST CHAPEL

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/DEJ/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0006	BUILDING NAME:	POST CHAPEL	
	Building UA:	1,426	CONDITIONED SQFT:	6,230

SYTEM INFORMATION	
System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

Catagory Number:	ING INFORMATION  Construction:	Usa		10 pt 4 c
<u> </u>		Use:	Occupancy HRS:	Occupancy Days:
	9 SANDSTONE BLOCK	CHURCH	0700-1800	M-F; SAT-SUN
Weeks of	Winter: 32	2		
Weeks of S	ummer: 20	o l		

SYSTEM OPERA	TING S	CHEDUI	E	1				
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:	e en antique a la constitución de la constitución d
PRES START:	0	0	0	0	0.	0	0	
PRES STOP:	24	24	24	24	24	24	24	
REQ START:	8	9	9	9	9	9	9	
REQ STOP:	22	16	16	22	16	16	12	

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,000
CFM-CLG:	4,000
%OA:	30%
%Area:	35%
CHILLER CAP (TONS):	(
KW-TON:	0.00
BLR CAP INPUT (BTUH):	(
BLR CAP OUTPUT (BTUH):	

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,160	3,360
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760
CLG HRS SAVED:	2,200	
HTG HRS SAVED:	3,520	
C/H HRS SAVED:	5,736	

<u>CONSTANTS</u>	•
HOAUHC:	16.4
HOAUH:	26.4
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	44.1
HOAOH:	70.9
COAOHC:	0.00145
COAOC:	0.00384
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000312
ECHC:	0.000118
NSUCHC:	0.000139
NSUCC:	0.000369
DDCCHC:	0.000229
DDCCC:	0.000607
NSC:	53200
DDCH:	46300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ/AMS

BLDG: 0006 BUILDING NAME: POST CHAPEL

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/vr
Schedule ST/SP	0.00	10,807.56	112.88	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	1118
Demand Limit	3.12	0.00	0.00	y. 11
Night Setback	0.00	3,189.06	26.55	
Sub Total	3.12	14,463.34	139.43	1
Economizer	0.00	1,427.46	0.00	
Ventilation/Recirculation	0.00	107.97	6.00	
DDC Control	0.00	2,770.25	23.11	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	18,769.02	168.54	1 3.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: AJN/DEJ/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0006 BUILDING NAME: POST CHAPE
--------------------------------------

Building UA: 1,426 CONDITIONED SQFT: 6,230

#### SYTEM INFORMATION 🚟

System Type: 15
System Name: Small Single Zone air handling unit

System Name: Small Single Zone air handling unit

System Number: AHU-2

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 9 SANDSTONE BLOCK CHURCH 0700-1800 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

<u>NPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,000
CFM-CLG:	4,000
%OA:	30%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESEN HR/YR	<u>T</u>
CLG HRS ON:	1,160	,	3,360
HTG HRS ON:	1,856	i :	5,376
H/C HRS ON:	3,024		8,760
CLG HRS SAVED:	2,200	<u>-</u> )	
HTG HRS SAVED:	3,520	i P	
C/H HRS SAVED:	5,736	Ĭ	

<u>CONSTANTS</u>	
HOAUHC:	16.4
HOAUH:	26.4
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	44.1
HOAOH:	70.9
COAOHC:	0.00145
COAOC:	0.00384
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000312
ECHC:	0.000118
NSUCHC:	0.000139
NSUCC:	0.000369
DDCCHC:	0.000229
DDCCC:	0.000607
NSC:	53200
DDCH:	46300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/DEJ/AMS

BLDG: 0006 BUILDING NAME: POST CHAPEL

ENERGY CALCULATION SUMMARY

System Type: 15

1000

System Name: Small Single Zone air handling unit

System Number: AHU-2

FUNCTION -	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	10,807.56	112.88	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	3,189.06	26.55	
Sub Total	3.12	14,463.34	139.43	
Economizer	0.00	1,427.46	0.00	
Ventilation/Recirculation	0.00	107.97	6.00	
DDC Control	0.00	2,770.25	23.11	-
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				3.0
Maintenance, Run Time, and Safety Alarms			1	/
TOTAL	3,12	18,769.02	168.54	3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0006	BUILDING NAME:	POST CHAPEL

Building UA: 1,426 CONDITIONED SQFT: 6,230

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

#### YPICAL BUILDING INFORMATION

 Catagory Number:
 Construction:
 Use:
 Occupancy HRS:
 Occupancy Days:

 9 SANDSTONE BLOCK
 CHURCH
 0700-1800
 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0		0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

INPUTS	
Motor HP:	0.12
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	900
CFM-CLG:	900
%OA:	0%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,160	3,360
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760
CLG HRS SAVED:	2,200	
HTG HRS SAVED:	3,520	† :
C/H HRS SAVED:	5,736	•

<u>ONSTANTS</u>	
HOAUHC:	16.
HOAUH:	26.
COAUHC:	0.00029
COAUC:	0.00077
HOAOHC:	44.
HOAOH:	70.
COAOHC:	0.0014
COAOC:	0.0038
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00031
ECHC:	0.00011
NSUCHC:	0.00013
NSUCC:	0.00036
DDCCHC:	0.00022
DDCCC:	0.00060
NSC:	5320
DDCH:	4630
OPT:	30
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95 PREPARED BY: AJN/DEJ/AMS

**BLDG**: 0006 BUILDING NAME: POST CHAPEL

ENERGY CALCULATION SUMMARY

System Type:

System Name: Small Single Zone air handling unit

System Number: AHU-3

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	641.83	0.00
Opt ST/SP	0.00	34.13	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	717.54	7.59
Sub Total	0.00	1,393.49	7.59
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	623.31	6.60
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.04
TOTAL	0.00	2,016,80	14.193.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0006	BUILDING NAME:	POST CHAPEL	
	Building UA:	1,426	CONDITIONED SQFT:	6,230

#### SYTEM INFORMATION ...

System Type: 1
System Name: Small hot water boiler
System Number: BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	9 SANDSTONE BLOCK	CHURCH	0700-1800	M-F; SAT-SUN
Weeks of	f Winter: 32	). •		
Weeks of S	Summer: 20	<u></u>		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0.	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

Motor HP:	0.24
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	25%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	750,000
BLR CAP OUTPUT (BTUH):	600,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,160	3,360
HTG HRS ON:	1,856	5,376
H/C HRS ON:	3,024	8,760
CLG HRS SAVED:	2,200	- !
HTG HRS SAVED:	3,520	-
C/H HRS SAVED:	5,736	=

<u>CONSTANTS</u>	
HOAUHC:	16.4
HOAUH:	26.4
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	44.1
HOAOH:	70.9
COAOHC:	0.00145
COAOC:	0.00384
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000312
ECHC:	0.000118
NSUCHC:	0.000139
NSUCC:	0.000369
DDCCHC:	0.000229
DDCCC:	0.000607
NSC:	53200
DDCH:	46300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/DEJ/AMS

BLDG: 0006 BUILDING NAME: POST CHAPEL

ENERGY CALCULATION SUMMARY

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
0.00	787.78	0.00	
0.00	68.26	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	856.04	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	4.25	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
	:		4.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         787.78           0.00         68.26           0.00         0.00           0.00         0.00           0.00         0.00           0.00         856.04           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         787.78         0.00           0.00         68.26         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         4.25           0.00         0.00         0.00           0.00         0.00         0.00

MCS NCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	O	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/DEJ/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0006	<b>BUILDING NAME:</b>	POST CHAPEL

**Building UA:** 1,426 CONDITIONED SQFT: 6,230

#### SYSTEM INFORMATION ......

System Type: 26

System Name: Pump System Number: CT-1

## TYPICAL EULDING NEORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 9 SANDSTONE BLOCK CHURCH 0700-1800 M-F; SAT-SUN

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	9	9	9	9	9	9
REQ STOP:	22	16	16	22	16	16	12

#### INPUTS Motor HP: 2.00 HP Effic: 0.78 0.80 Load Factor: CFM-HTG: 0 CFM-CLG: 0 %OA: 0% 0% %Area: CHILLER CAP (TONS): 0 KW-TON: 1.10 BLR CAP INPUT (BTUH): 0 BLR CAP OUTPUT (BTUH): 0

#### HOURS CALCULATIONS

REQUIRED	PRESENT
HR/YR	HR/YR
1,160	3,360
1,856	5,376
3,024	8,760
2,200	<del>.</del>
3,520	1
5,736	
	HR/YR : 1,160 : 1,856 : 3,024 : 2,200 : 3,520

<u>CONSTANTS</u>	
HOAUHC:	16.4
HOAUH:	26.4
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	44.1
НОАОН:	70.9
COAOHC:	0.00145
COAOC:	0.00384
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000312
ECHC:	0.000118
NSUCHC:	0.000139
NSUCC:	0.000369
DDCCHC:	0.000229
DDCCC:	0.000607
NSC:	53200
DDCH:	46300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/DEJ/AMS

BLDG: 0006 BUILDING NAME: POST CHAPEL

ENERGY CALCULATION SUMMARY

 System Type:
 26

 System Name:
 Pump

 System Number:
 CT-1

- FUNCTION	kW/yr	kWh/yr	MBtu/yr MH/yr	
Schedule ST/SP	0.00	3,366.56	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.17	3,833.29	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			,	3.0
TOTAL	1.17	3,833.29	0.00	3.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	AND COS AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1		1	0	\$386.00

# BUILDING 27 OFFICER QUARTERS MILIT

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS P

DATE: 16-Sep-95
PREPARED BY: AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0027	BUILDING NA	ME:	OFF QTRS MILIT	
	Building UA:	6,395	-	CONDITIONED SQFT:	38,146

System Name:	Small hot water boiler	
System Type:	1	
SYTEMINFORMATION	Maria Caraca	Charles Line

System Number: BLR-1

CCANDCTO			cy HRS: Occupancy Days:
6 SANUS I U	NE BLOCK BARRACK	(S 0000-240	0 M-F; SAT-SUN
Weeks of Winter:	32		

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: THUR: FRI: SAT: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 0 0 0 0 0 0 0 **REQ START:** 24 24 24 24 24 24 24 **REQ STOP:**

<u>inputs</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	500,000
BLR CAP OUTPUT (BTUH):	405,000

	REQUIRED HR/YR	PRESENT HR/YR	-
CLG HRS ON:	3,360	3,	360
HTG HRS ON:	5,376	5,	376
H/C HRS ON:	8,760	8,	760
CLG HRS SAVED:	. 0	Ì	
HTG HRS SAVED:	0	!	
C/H HRS SAVED:	. 0	i	

Control of the second of the second second

<u>ONSTANTS</u>	
HOAUHC:	C
HOAUH:	C
COAUHC:	(
COAUC:	(
HOAOHC:	8.06
HOAOH:	1;
COAOHC:	0.000274
COAOC:	0.00072
DC DUTY:	0.17
DC DEMAND:	0.1
ECC:	0.00026
ECHC:	0.00010
NSUCHC:	(
NSUCC:	
DDCCHC:	0.000089
DDCCC:	0.00023
NSC:	1890
DDCH:	3760
OPT:	
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/AMS

BLDG: 0027 BUILDING NAME: OFF QTRS MILIT

#### ENERGY CALCULATION SUMMARY

System Type: 1
System Name: Small hot water boiler
System Number: BLR-1

" FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	1
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.84	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	2.84	, 4.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0027	BUILDING NAME:	BUILDING NAME: OFF QTRS MILIT				
	Building UA:	6,395	CONDITIONED SQFT:	38,			

38,146

#### SYTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-2

TYPICAL BUILD	ING INFORMATION			
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0.	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	400,000
BLR CAP OUTPUT (BTUH):	329,000

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 3,360 3,360 HTG HRS ON: 5,376 5,376 H/C HRS ON: 8,760 8,760 CLG HRS SAVED: 0 0 HTG HRS SAVED: C/H HRS SAVED: 0

<u>ONSTANTS</u>	•
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

BLDG: 0027

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: AJN/AMS

**DATE:** 16-Sep-95

BUILDING NAME: OFF QTRS MILIT

ENERGY CALCULATION SUMMARY

System Type: 1
System Name: Small hot water boiler
System Number: BLR-2

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.27	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:		4.00
TOTAL	0.00	0.00	2.27	4.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	O	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95 PREPARED BY: AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0027	BUILDING NAME:	OFF QTRS MILIT	
	Building UA:	6,395	CONDITIONED SQFT:	38,146

#### SYTEM INFORMATION System Type: 26 System Name: Pump

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN

#### SYSTEM OPERATING SCHEDULE

System Number: CWP-1

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	- 0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLP CAP OUTPUT (BTUH):	n

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR CLG HRS ON: 3,360 3,360 HTG HRS ON: 5,376 5,376 H/C HRS ON: 8,760 8,760 CLG HRS SAVED: 0 HTG HRS SAVED: 0 C/H HRS SAVED: 0

The second second section is the second

NSTANTS	
HOAUHC:	
HOAUH:	
COAUHC:	
COAUC:	
HOAOHC:	8.0
НОАОН:	1;
COAOHC:	0.000274
COAOC:	0.00072
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00026
ECHC:	0.00010
NSUCHC:	
NSUCC:	
DDCCHC:	0.000089
DDCCC:	0.00023
NSC:	1890
DDCH:	3760
OPT:	
CHWR:	17.
CNWR:	
OAR:	5.6

0027

BLDG:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: AJN/AMS

**DATE**: 16-Sep-95

BUILDING NAME: OFF QTRS MILIT

ENERGY CALCULATION SUMMARY

 System Type:
 26

 System Name:
 Pump

 System Number:
 CWP-1

<u>FUNCTION</u>	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	and the second
Demand Limit	2.80	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.80	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.80	0,00	0.00	* 3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	DO	ÃO	DI	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS

38,146

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0027	BUILDING NAME:	OFF QTRS MILIT
	002.		

**Building UA:** CONDITIONED SQFT: 6,395

SYJEM INFORMATION

System Type: 26 System Name: Pump

System Number: CWP-2

FYPICAL BUILDING INFORMATION ....

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: **6 SANDSTONE BLOCK** BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32 Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

«SUN: MON: TUE: WED: THUR: FRI: SAT: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 REQ START: 0 0 0 0 0 0 0 REQ STOP: 24 24 24 24 24 24 24

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	-
HTG HRS SAVED:	0	ř
C/H HRS SAVED:	0	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0.
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

BLDG: 0027 BUILDING NAME: OFF QTRS MILIT ENERGY CALCULATION SUMMARY August 1

26 System Type: Pump System Name: CWP-2

System Number:

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.80	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.80	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,	1	1		3.00
Maintenance, Run Time, and Safety Alarms				
TOTAL	2.80	0.00	0.00	3.00

UMCS FUNCTN	TYPICAL SYSTEM  UMCS APPLICATION	POINT A	ND COS	T SUMMA	\RY AI	COST
NO.		POINTS	POINTS	POINTS	POINTS	
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	O	\$386.00

## BUILDING 29 RED CROSS BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0029	BUILDING NAME:	RED CROSS BLDG	
	Building UA:	2,004	CONDITIONED SQFT:	3,000

# SYTEM INFORMATION System Type: 15 System Name: Small Single Zone air handling unit System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter: 32			
Weeks of S	Summer: 20	<del>,</del> )		

SYSTEM OPERA	TING S	<u>CHEDUL</u>	E				
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	10	8	8	10
REQ STOP:	0	17	17	17	17	17	12

0.50	Motor HP:
0.66	HP Effic:
0.80	Load Factor:
2,250	CFM-HTG:
2,250	CFM-CLG:
10%	%OA:
60%	%Area:
C	CHILLER CAP (TONS):
0.00	KW-TON:
C	BLR CAP INPUT (BTUH):
C	BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	Ī
HTG HRS SAVED:	3,936	i i
C/H HRS SAVED:	6,414	-

<u>CONSTANTS</u>	•
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 0029

BUILDING NAME: RED CROSS BLDG

#### ENERGY CALCULATION SUMMARY

System Type: Small Single Zone air handling unit System Name: System Number: AHU-1

<u>FUNCTION</u>	<u>kWlyr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,899.71	40.12	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.92	0.00	0.00	
Night Setback	0.00	8,788.20	157.51	
Sub Total	0.92	11,825.80	197.63	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,169.86	51.82	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00

UMCS UNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	ARY AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #:** DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0029	BUILDING NAME	: RED CROSS BLDG	
	Building UA:	2,004	CONDITIONED SQFT:	3,000

#### BYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLO	СК	ADMINISTRATION	0700-1700	M-F
Weeks of	Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	10	8	8	10
REQ STOP:	0	17	17	17	17	17	12

<u>INPUTS</u>	
Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	1,500
CFM-CLG:	1,500
%OA:	10%
%Агеа:	40%
CHILLER CAP (TONS):	0,
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 900 3,360 HTG HRS ON: 5,376 1,440 H/C HRS ON: 2,346 8,760 CLG HRS SAVED: 2,460 HTG HRS SAVED: 3,936 C/H HRS SAVED: 6,414

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
НОАОНС:	40.4
ноаон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG:	0029		BUILDING NAME:	RED CROSS BLDG
	A company	ENER	GY CALCULAT	TION SUMMARY
		A.F.	CACAMITY CONTRACTOR CO	had market (2.4.1) min modern contraction and the

System Type: 15
System Name: Small Single Zone air handling unit

System Number: AHU-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	1,943.25	26.74	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.62	0.00	0.00	
Night Setback	0.00	5,858.80	105.01	
Sub Total	0.62	7,894.46	131.75	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,446.57	34.55	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				, 3.0 <sup>4</sup>
TOTAL	0.62	9,341.04	166.30	3.0

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0029	BUILDING NAME:	RED CROSS BLDG
	Desilation and A		

**Building UA:** CONDITIONED SQFT: 2,004 3,000

#### SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: **4 SANDSTONE BLOCK ADMINISTRATION** 0700-1700 M-F Weeks of Winter: 32

Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	10	8	8	10
REQ STOP:	0	17.	17	17	17	17	12

<u>NPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	6
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

## HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

27.8	HOAUHC:
. 44.6	HOAUH:
C	COAUHC:
C	COAUC:
40.4	HOAOHC:
65	HOAOH:
0.000877	COAOHC:
0.00232	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0000629	ECC:
0.0000238	ECHC:
0.000609	NSUCHC:
0.00161	NSUCC:
0.000411	DDCCHC:
0.00109	DDCCC:
131000	NSC:
43100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: AJN/CWW

**DATE:** 16-Sep-95

BLDG: 0029 BUILDING NAME: RED CROSS BLDG

ENERGY CALCULATION SUMMARY

System Type: 8
System Name: Air cooled DX compressor

System Number: CH-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	105.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	5.05	0.00	0.00	
Remote Monitoring,				3.00
Maintenance, Run Time,		1		
and Safety Alarms				
TOTAL	5.05	105,00	0.00	. 3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO	T SUMMA DI POINTS	ARY AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0029	BUILDING NAME:	RED CROSS BLDG	
	Building UA:	2.004	CONDITIONED SQFT:	3,000

# SYTEM INFORMATION System Type: 8 System Name: Air cooled DX compressor System Number: CH-2

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days
	4 SANDSTONE BLOCK		ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:	32			
Weeks of	Summer:	20			

TING S	CHEDUL	<b>E</b>				***
SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
0	0	0	0	0	0	0
24	24	24	24	24	24	24
0	8	8	10	8	8	10
. 0	17	17	17	17	17	12
	SUN: 0 24 0 0	SUN:         MON:           0         0           24         24           0         8           0         17	TING SCHEDULE           SUN:         MON:         TUE:           0         0         0           24         24         24           0         8         8           0         17         17	TING SCHEDULE           SUN:         MON:         TUE:         WED:           0         0         0         0           24         24         24         24           0         8         8         10           0         17         17         17	TING SCHEDULE           SUN:         MON:         TUE:         WED:         THUR:           0         0         0         0           24         24         24         24           0         8         8         10         8           0         17         17         17         17	TING SCHEDULE           SUN:         MON:         TUE:         WED:         THUR:         FRI:           0         0         0         0         0           24         24         24         24         24           0         8         8         10         8         8           0         17         17         17         17         17

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	(
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	
KW-TON:	1.10
BLR CAP INPUT (BTUH):	(
BLR CAP OUTPUT (BTUH):	(

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	1
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	-

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

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BUILDING NAME: RED CROSS BLDG
ENERGY CALCULATION SUMMARY

System Type: 8

BLDG: 0029

System Name: Air cooled DX compressor

System Number: CH-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	- <u>MBtu/yr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	!	:		3.0
TOTAL	4.21	87.50	0.00	3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	O	\$243.00

## BUILDING 200 ADMINISTRATION GENERAL PURPOSE

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #**: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 09-Dec-95
PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0200 BUILDING NAME: ADMIN GEN PURP

Building UA: 16,960 CONDITIONED SQFT: 60,690

SYTEM INFORMATION

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

TYPICAL BUILD Catagory Number:	Construction:	HON	Use:	Occupancy UPS:	Occupancy Payer
Catagory Number.				Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BL	OCK	ADMINISTRATION	0700-1700	M-F
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,562,500
BLR CAP OUTPUT (BTUH):	2,050,000

REQUIRED	PRESENT
HR/YR	HR/YR
3,360	3,360
5,376	5,376
8,760	8,760
0	
0	:
0	l r
	3,360 5,376 8,760

<u>ONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 **DATE:** 09-Dec-95

PREPARED BY: AJN/CWW

BUILDING NAME: ADMIN GEN PURP BLDG: 0200

ENERGY CALCULATION SUMMARY

3 System Type:

System Name: Small steam boiler

BLR-1 System Number:

FUNCTION	<u>kW/yr</u> ]	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0,00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4. 0.00

UMCS PUNCTI		DO	ID COST AO POINTS	DI	RY AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TOTAL:	1	0	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

RI DG:	0200	BUILDING NAME:	ADMIN GEN PURP

16,960 **Building UA:** 

CONDITIONED SQFT:

60,690

## SYTEM INFORMATION

System Type: 3

System Name: Small steam boiler

System Number: BLR-2

Catagory Number:	Construction:	⊍se:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks of	Winter: 3	2		
Weeks of Weeks of S		2		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	C
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	(
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,562,500
BLR CAP OUTPUT (BTUH):	2,050,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	C	)
HTG HRS SAVED:	C	j.
C/H HRS SAVED:	C	

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 0200

BUILDING NAME: ADMIN GEN PURP **ENERGY CALCULATION SUMMARY** 

3

System Type: System Name:

Small steam boiler

System Number:

BLR-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,		ı		4.00
Maintenance, Run Time, and Safety Alarms			:	
TOTAL	0.00	0.00	0.00	4.00

UMCS FUNCT		M POINT AI	ND COST	rsumma Di	RY AI	COST
<b>NO.</b> 7	Steam Boiler Monitoring	POINTS 1	POINTS 0	POINTS 3	POINTS 1	<b>\$1,015.00</b>
	TOTAL:	1	0	3		\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0200		BUILDING	NAME: ADMIN	GEN PURP	
Buildir	ng UA:	16,960	COND	ITIONED SQFT:	60,690
YTEM INFORMA	TION				
	Type: 26			· · · · · · · · · · · · · · · · · · ·	
	Name: Pump				
System Nu					

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days
<u></u>	4 SANDSTONE BLO	CK	ADMINISTRATION	0700-1700	M-F
Weeks o	of Winter:	32			
Weeks of	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

\$7.50-addition if notice the investment is a nation comment.	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	C
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	C
KW-TON:	1.10
BLR CAP INPUT (BTUH):	
BLR CAP OUTPUT (BTUH):	

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR 3,360 3,360 CLG HRS ON: 5,376 5,376 HTG HRS ON: H/C HRS ON: 8,760 8,760 CLG HRS SAVED: 0 0 HTG HRS SAVED: C/H HRS SAVED: 0

	CONSTANTS
27.8	HOAUHC:
44.6	HOAUH:
0	COAUHC:
0	COAUC:
40.4	HOAOHC:
65	нолон:
0.000877	COAOHC:
0.00232	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0000629	ECC:
0.0000238	ECHC:
0.000609	NSUCHC:
0.00161	NSUCC:
0.000411	DDCCHC:
0.00109	DDCCC:
131000	NSC:
43100	DDCH:
305	OPT:
17.5	CHWR:
(	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 0200 BUILDING NAME: ADMIN GEN PURP

ENERGY CALCULATION SUMMARY

 System Type:
 26

 System Name:
 Pump

 System Number:
 CT-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	1,115.34	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	1,115.34	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL TOTAL	0.00	1,115,34	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	AO	T SUMMA DI POINTS	ARY AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0200	BUILDING NAME:	ADMIN GEN PURP	
	Building UA:	16,960	CONDITIONED SQFT:	60,690

#### SYTEM INFORMATION

System Type: 26 System Name: Pump System Number: CT-2

Catagory Number:	ING INFORMATION  Construction:	e 21646 iz	Use:	Occupancy HRS:	Occupancy Days:
oatagory Number:	4 SANDSTONE BLOCK		ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

# SYSTEM OPERATING SCHEDULE

**************************************	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		PRESENT
	HR/YR	HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	C	)
HTG HRS SAVED:	C	j:
C/H HRS SAVED:	C	)

•	<u>NSTANTS</u>
27.8	HOAUHC:
44.6	HOAUH:
(	COAUHC:
(	COAUC:
40.4	HOAOHC:
6	HOAOH:
0.00087	COAOHC:
0.00232	COAOC:
0.1	DC DUTY:
0.1	DC DEMAND:
0.000062	ECC:
0.000023	ECHC:
0.000609	NSUCHC:
0.0016	NSUCC:
0.00041	DDCCHC:
0.0010	DDCCC:
13100	NSC:
4310	DDCH:
30	OPT:
17.	CHWR:
	CNWR:
5.6	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 0200 BUILDING NAME: ADMIN GEN PURP

ENERGY CALCULATION SUMMARY

 System Type:
 26

 System Name:
 Pump

 System Number:
 CT-2

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	<u> </u>
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	263.04	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	:			3.
TOTAL	0.00	263.04	0.00	<b>4. 3.</b> I

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:		0			\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0200	BUILDING NAME	: ADMIN GEN PURP	
	Building UA:	16,960	CONDITIONED SQFT:	60,690

SYTEM INFORMATION ...

System Type: 22
System Name: Heat pump unit
System Number: HP-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks of	Winter:	32		
Weeks of S	Summer:	20		

SYSTEM OPERATING SCHEDULE

Troff shall a state of grant and services	SUN:	MON:	TUE:		THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7.	0
REQ STOP:	0	17	17	17	17	17	0

3.50	Motor HP:
0.64	HP Effic:
0.80	Load Factor:
11,270	CFM-HTG:
11,270	CFM-CLG:
0%	%OA:
20%	%Area:
	CHILLER CAP (TONS):
0.0	KW-TON:
	BLR CAP INPUT (BTUH):
	BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	1,000	3,360
HTG HRS ON	1,600	5,376
H/C HRS ON	2,607	8,760
CLG HRS SAVED	2,360	)
HTG HRS SAVED	: 3,776	•
C/H HRS SAVED	: 6,153	•

CONSTANTS	•
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	C
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 0200 BUILDING NAME: ADMIN GEN PURP

ENERGY CALCULATION SUMMARY

System Type: 22

System Name: Heat pump unit

System Number: HP-1

FUNCTION	<u>kW/yr</u>	· <u>kWh/yr</u>	<u>MBtu/yr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	20,081.39	0.00	
Opt ST/SP	0.00	995.44	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	42,229.70	444.35	
Sub Total	0.00	63,306.54	444.35	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time,				0.
and Safety Alarms TOTAL	0.00	63,306.54	444.35	· 0.

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	A POINT A  DO POINTS	AO POINTS	T SUMMA DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	O	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

60,690

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0200	<b>BUILDING NAME:</b>	ADMIN GEN PURP
------------	-----------------------	----------------

Building UA: 16,960 CONDITIONED SQFT:

#### SYTEM INFORMATION

System Type: 22

System Name: Heat pump unit

System Number: HP-2

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

<b>***************</b>	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	6,660
CFM-CLG:	6,660
%OA:	0%
%Area:	10%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED	2,360	<u>.</u> !
HTG HRS SAVED	3,776	i
C/H HRS SAVED	6,153	- }.

#### **CONSTANTS** HOAUHC: 27.8 44.6 HOAUH: 0 COAUHC: 0 COAUC: 40.4 HOAOHC: 65 HOAOH: COAOHC: 0.000877 0.00232 COAOC: DC DUTY: 0.17 DC DEMAND: 0.17 0.0000629 ECC: ECHC: 0.0000238 **NSUCHC:** 0.000609 0.00161 **NSUCC:** DDCCHC: 0.000411 DDCCC: 0.00109 131000 NSC: DDCH: 43100 305 OPT: 17.5 CHWR: CNWR: 0 OAR: 5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG:	0200	BUILDING NAME		
5.	in Arres	ENERGY CALCULA	TION SUI	<b>UMARY</b>
				and a second

System Type: 22
System Name: Heat pump unit

System Number: HP-2

FUNCTION .	kW/yr	<u>kWh/yr</u>	<u>MBtu/yr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	9,415.45	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	24,955.62	222.18	
Sub Total	0.00	34,837.80	222.18	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.0
TOTAL	-0.00	34,837.80	222.18	° 0.1

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	A POINT A  DO POINTS	ND COS AO POINTS	T SUMMA  DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

LOCATION: FT. RILEY, KS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0200	BUILDING NAME:	ADMIN GEN PURP
			ADMINI OCH LON

		W. W.E. FIBRING CERT ON	
Building UA:	16,960	CONDITIONED SQFT:	60,690

#### SYTEM INFORMATION

System Type: 22

System Name: Heat pump unit

System Number: HP-3

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:	32		
Weeks of S	Summer: 2	20		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	5,910
CFM-CLG:	5,910
%OA:	0%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH)	n

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	- 
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	- i

<u> </u>	(#ECC. (22.5 to 12.5 to
HOAUHC:	27.
HOAUH:	44.
COAUHC:	
COAUC:	
HOAOHC:	40
HOAOH:	6
COAOHC:	0.00087
COAOC:	0.0023
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.000062
ECHC:	0.000023
NSUCHC:	0.00060
NSUCC:	0.0016
DDCCHC:	0.00041
DDCCC:	0.0010
NSC:	13100
DDCH:	4310
OPT:	30
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG:	0200	BUILDING NAME: ADM	
		ENERGY CALCULATION	SUMMARY
	A LE SA		######################################

System Type: 22
System Name: Heat pump unit
System Number: HP-3

FUNCTION -	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	9,415.45	0.00
Opt ST/SP	0.00	466.73	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	22,145.30	222.18
Sub Total	0.00	32,027.48	222.18
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			0.
TOTAL	0.00	32,027.48	222.18 0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
	Scheduled start/stop control - Unitary Equip; Optimum start/stop Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0200	BUILDING NAME:	ADMIN GEN PURP

16,960 **Building UA:** 

CONDITIONED SQFT:

60,690

#### SYTEM INFORMATION

System Type: 22

System Name: Heat pump unit

System Number: HP-4

#### TYPICAL BUILDING INFORMATION

Occupancy Days: Occupancy HRS: Catagory Number: Construction: 0700-1700 M-F ADMINISTRATION **4 SANDSTONE BLOCK** 

Weeks of Winter: 32 Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

#### INPUTS 2.50 Motor HP: HP Effic: 0.64 0.80 Load Factor: 8,470 CFM-HTG: 8,470 CFM-CLG: 0% %OA: 10% %Area: 0 CHILLER CAP (TONS): 0.00 KW-TON: 0 **BLR CAP INPUT (BTUH):** 0

#### **HOURS CALCULATIONS**

**BLR CAP OUTPUT (BTUH):** 

	PRESENT HR/YR
1,000	3,360
: 1,600	5,376
2,607	8,760
: 2,360	<u>.</u>
: 3,776	
: 6,153	-

CONSTANTS	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE:** 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 0200

BUILDING NAME: ADMIN GEN PURP

## ENERGY CALCULATION SUMMARY

System Type: Heat pump unit System Name: System Number: HP-4

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	14,343.85	0.00
Opt ST/SP	0.00	711.03	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	31,737.85	222.18
Sub Total	0.00	46,792.73	222.18
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:	0.0
TOTAL	. 0.00	46,792.73	222.18 0.0

UMCS FUNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	POINT A  DO POINTS	AO	T SUMM/ DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	•	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0200	BUILD	ING NAME:	ADMIN GEN PURP	
	Building UA:	16,960		CONDITIONED SQFT:	60,690

#### SYTEM INFORMATION

System Type: 22
System Name: Heat pump unit

System Number: HP-5

Catagory Number:	Construction:	Use:		Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINIS <sup>*</sup>	TRATION	0700-1700	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	. 24
REQ START:	0	7	7	7	7	7	. 0
REQ STOP:	0	17	17	17	17	17	0

NPUTS	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	7,480
CFM-CLG:	7,480
%OA:	0%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	I
HTG HRS SAVED:	3,776	-
C/H HRS SAVED:	6,153	

	<u>CONSTANTS</u>
27.8	HOAUHC:
44.6	HOAUH:
0	COAUHC:
0	COAUC:
40.4	HOAOHC:
65	нолон:
0.000877	COAOHC:
0.00232	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0000629	ECC:
0.0000238	ECHC:
0.000609	NSUCHC:
0.00161	NSUCC:
0.000411	DDCCHC:
0.00109	DDCCC:
131000	NSC:
43100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:
0	CNWR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

**DATE:** 16-Sep-95

BLDG: 0200

BUILDING NAME: ADMIN GEN PURP

## ENERGY CALCULATION SUMMARY

System Type: 22

Heat pump unit System Name:

HP-5 System Number:

FUNCTION	<u>kW/yr</u>	<u>kWhiyr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	9,415.45	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	28,028.23	222.18	
Sub Total	0.00	37,910.41	222.18	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.0

UMCS FUNCTN NO.	TYPICAL SYSTEN  UMCS APPLICATION	POINT A  DO  POINTS	AND COS AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	O	1	2	\$1,213.00
	TOTAL:	1	0 1	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

DG: 0200	BUI	LDING NAME:	ADMIN GEN PURP	
Building UA:	16,960	-	CONDITIONED SQFT:	60,690
TEM INCODMATION				100
Control Contro				1911 - 1911 1913 - 1911 - 1911 - 1911 - 1911 - 1911 - 1911 - 1911 - 1911 - 1911 - 1911 - 1911 - 1911 - 1911 - 1911 - 1911 -
TEM INFORMATION System Type:				- 140 M
TEM INFORMATION System Type: System Name:	22			- 1900 -

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:	32		
Weeks of	Summer:	20		

## SYSTEM OPERATING SCHEDULE

Ellinde de biologia internaciona con construente parate	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	. 24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	4.00
HP Effic:	0,64
Load Factor:	0.80
CFM-HTG:	8,000
CFM-CLG:	8,000
%OA:	13%
%Area:	27%
CHILLER CAP (TONS):	(
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	(

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	-  -
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	-

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
ноаон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BUILDING NAME: ADMIN GEN PURP BLDG: 0200

ENERGY CALCULATION SUMMARY

System Type: System Name: Heat pump unit

System Number: HP-6

FUNCTION 7	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	22,950.16	177.89	
Opt ST/SP	0.00	1,137.65	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	29,976.72	599.88	
Sub Total	0.00	54,064.53	777.77	
Economizer	0.00	0.00	0.00	
/entilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.0
TOTAL	0.00	54,064.53	777.77	

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMM/ DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	FOTAL:	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: AJN/CWW

<b>ENERGY</b>	CAL	CUI	ATION	PARA	METERS
	<b>U</b>	.~~_		$I \cap I \setminus I$	

BLDG:	0200	BUILDING NAM	E: ADMIN GEN PURP	
	Building UA:	16,960	CONDITIONED SQFT:	60,690

48 Carlot (1984)			
and the contract of the contra		3.44 30 25 31 31 31 31 31 31 31 31 31 31 31 31 31	The state of the
26			
Pump			1
HWP-1		11 11 1 11 11 11 11 11 11 11 11 11 11 1	
	Pump	Pump	Pump

icy Days:	Occupancy	Occupancy HRS:	Use:		Construction:	Catagory Number:
	M-F	0700-1700	ADMINISTRATION	BLOCK	SANDSTONE BLO	4
				32	Winter:	Weeks of V
				32		Weeks of V

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>NPUTS</u>	of States
Motor HP:	50.00
HP Effic:	0.92
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

## HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED	. 0	
HTG HRS SAVED	. 0	•
C/H HRS SAVED:	. 0	•

<u>NSTANTS</u>	•
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BUILDING NAME: ADMIN GEN PURP BLDG: 0200 

ENERGY CALCULATION SUMMARY

26 System Type: Pump System Name: System Number: HWP-1

<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>M</u>	<u> Нуг</u>
0.00	.00	0.00	
0.00	9,946.67	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	9,946.67	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
		:	3.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         .00           0.00         9,946.67           0.00         0.00           0.00         0.00           0.00         0.00           0.00         9,946.67           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         .00         0.00           0.00         9,946.67         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

	TYPICAL SYSTEM	I POINT A	ND COS	TSUMMA	<b>RY</b>	
UMCS	UMCS APPLICATION	DO	AO	DI	AT	COST
NO.	UNCS AFFLICATION	POINTS		POINTS	POINTS	
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0200	BUILDING NAME:	ADMIN GEN PURP
			/ IDMINIT CENT ON

Building UA:	16,960	[	CONDITIONED SQFT:	60,690

# SYTEM INFORMATION System Type: 26 System Name: Pump System Number: HWP-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter: 3	2		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS	
Motor HP:	50.00
HP Effic:	0.92
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	. 0	-
HTG HRS SAVED:	0	1
C/H HRS SAVED:	0	<del>-</del>

27.8
44.6
0
0
40.4
65
0.000877
0.00232
0.17
0.17
0.0000629
0.0000238
0.000609
0.00161
0.000411
0.00109
131000
43100
305
17.5
0
5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG:	0200	BUILDING NAME:	ADMIN GEN PURP
	The second second	ENERGY CALCULAT	TION SUMMARY

System Type: 26 System Name: Pump HWP-2 System Number:

<u>FUNCTION</u>	<u>kWiyr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u>	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	9,946.67	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	9,946.67	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	9,946.67	0.00	* 3.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	(RY	
UMCS FUNCTI		DO	ÄÖ	DI	AI	COST
NO.	100 (100 (100 (100 (100 (100 (100 (100	POINTS	POINTS	POINTS	POINTS	
24	Scheduled start/stop control -	1	0	1	0	\$386.00
	Pump; Optimum start/stop - Pump;					
	Demand limiting - Pump					
	TOTAL:	1	0	1	0	\$386.00

# BUILDING 202 PHYSICAL FITNESS CENTER

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM.AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0202	BUILDING NAME:	PHYS FITNESS CTR

**Building UA:** 6,674 CONDITIONED SQFT:

51,307

#### SY TEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
16 BRICK AND CMU		GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	21	22	22	22	22	22	21

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,500
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 2,080 3,360 HTG HRS ON: 3,328 5,376 H/C HRS ON: 5,423 8,760 CLG HRS SAVED: 1,280 HTG HRS SAVED: 2,048 C/H HRS SAVED: 3,337

<u>CONSTANTS</u>	•
HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM.AJN/AMS

BLDG: 0202 BUILDING NAME: PHYS FITNESS CTR

						L							

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

<u>kW/yr kWh/yr MBtu/yr MH/yr</u>
0.00 1,958.73 0.00
0.00 466.73 0.00
0.00 0.00
1.17 0.00 0.00
0.00 0.00 0.00
1.17 2,425.46 0.00
0.00 0.00 0.00
0.00 0.00 0.00
0.00 0.00 0.00
0.00 0.00 0.00
0.00 0.00 0.00
0.00 0.00 0.00
0.00 0.00 0.00
117 242546 0.00
1.17 2.425.46

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2 ·	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM.AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0202 BUILDING NAME: PHYS FITNESS CTR

Building UA: 6,674 CONDITIONED SQFT: 51,307

SYTEM INFORMATION

System Type: 13

System Name: Large Single Zone air handling unit

System Number: AHU-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	6 BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	21	22	22	22	22	22	21

INPUTS	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	18,500
CFM-CLG:	18,500
%OA:	10%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	Ō

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,080	3,360
HTG HRS ON:	3,328	5,376
H/C HRS ON:	5,423	8,760
CLG HRS SAVED:	1,280	=
HTG HRS SAVED:	2,048	:
C/H HRS SAVED:	3,337	:

	UNSTANTS
20	HOAUHC:
33	HOAUH:
0.0002	COAUHC:
0.0005	COAUC:
27	HOAOHC:
44	HOAOH:
0.0003	COAOHC:
0.001	COAOC:
0.	DC DUTY:
0.	DC DEMAND:
0.0000	ECC:
0.00000	ECHC:
0.0006	NSUCHC:
0.001	NSUCC:
0.00001	DDCCHC:
0.00003	DDCCC:
4250	NSC:
110	DDCH:
3	OPT:
17	CHWR:
	CNWR:
5.	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM.AJN/AMS

BLDG: 0202 BUILDING NAME: PHYS FITNESS CTR

## ENERGY CALCULATION SUMMARY

System Type: 13

System Name: Large Single Zone air handling unit

System Number: AHU-2

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	13,518.47	129.03	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	39,326.56	283.65	
Sub Total	7.46	53,960.38	412.68	
Economizer	0.00	832.68	0.00	
Ventilation/Recirculation	0.00	120.19	11.79	
DDC Control	0.00	1,434.62	7.34	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		. :		5.00
TOTAL	7,46	56,347.86	431.81	5.00

UMCS TUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
26	Direct digital control - Large SZ AHU	0	2	0	4	\$1,281.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM.AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0202 BUILDING NAME: PHYS FITNESS CTR

Building UA: 6,674 CONDITIONED SQFT: 51,307

#### SYTEM INFORMATION

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	⊎se:	Occupancy HRS:	Occupancy Days:
1	16 BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

and a second	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	21	22	22	22	22	22	21

#### 0.00 Motor HP: HP Effic: 0.00 Load Factor: 0.80 0 CFM-HTG: CFM-CLG: 0 %OA: 0% %Area: 0% CHILLER CAP (TONS): 0 KW-TON: 0.00 BLR CAP INPUT (BTUH): 5,313,000 **BLR CAP OUTPUT (BTUH):** 4,250,000

#### HOURS CALCULATIONS

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	2,080	3,360
HTG HRS ON:	3,328	5,376
H/C HRS ON:	5,423	8,760
CLG HRS SAVED:	1,280	
HTG HRS SAVED:	2,048	: ! !
C/H HRS SAVED:	3,337	i İ

#### **CONSTANTS HOAUHC:** 20.9 HOAUH: 33.6 COAUHC: 0.000213 0.000562 COAUC: HOAOHC: 27.8 HOAOH: 44.7 COAOHC: 0.000391 COAOC: 0.00103 DC DUTY: 0.17 DC DEMAND: 0.17 0.000022 ECC: 0.0000083 ECHC: NSUCHC: 0.000637 NSUCC: 0.00168 DDCCHC: 0.0000143 DDCCC: 0.0000378 NSC: 425000 DDCH: 11000 OPT: 305 CHWR: 17.5 CNWR: 0

OAR:

5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 09-Dec-95

PREPARED BY: JM.AJN/AMS

BLDG: 0202

BUILDING NAME: PHYS FITNESS CTR

ENERGY CALCULATION SUMMARY

System Type: 3
System Name: Small steam boiler

System Number: BLR-1

FUNCTION	kW/vr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.

UMCS FUNCTI NO:		DO	ND COST AO POINTS	DI	RY AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TOTAL	1	0	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM.AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0202 BUILDING NAME: PHYS FITNESS CTR	BLDG:	0202	BUILDING NAME:	PHYS FITNESS CTR
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Building UA: 6,674 CONDITIONED SQFT: 51,307

#### SYTEM INFORMATION

System Type: 7

System Name: Large air cooled chiller

System Number: CH-1

#### YPICAL BUILDING INFORMATION

 Catagory Number:
 Construction:
 Use:
 Occupancy HRS:
 Occupancy Days:

 16BRICK AND CMU
 GYMNASIUM
 0600-2200
 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	21	22	22	22	22	22	21

#### **INPUTS** 0.00 Motor HP: **HP Effic:** 0.64 Load Factor: 0.80 CFM-HTG: 0 0 CFM-CLG: %OA: 0% %Area: 0% CHILLER CAP (TONS): 45 KW-TON: 1.10 **BLR CAP INPUT (BTUH):** 0 BLR CAP OUTPUT (BTUH): 0

#### HOURS CALCULATIONS

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	2,080	3,360
HTG HRS ON:	3,328	5,376
H/C HRS ON:	5,423	8,760
CLG HRS SAVED:	1,280	
HTG HRS SAVED:	2,048	•
C/H HRS SAVED:	3,337	•

<u>NSTANTS</u>	
HOAUHC:	20.
HOAUH:	33.
COAUHC:	0.00021
COAUC:	0.00056
HOAOHC:	27.
НОАОН:	44.
COAOHC:	0.00039
COAOC:	0.0010
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00002
ECHC:	0.000008
NSUCHC:	0.00063
NSUCC:	0.0016
DDCCHC:	0.000014
DDCCC:	0.000037
NSC:	42500
DDCH:	1100
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM.AJN/AMS

BLDG: 0202

BUILDING NAME: PHYS FITNESS CTR

#### ENERGY CALCULATION SUMMARY

System Type: 7
System Name: Large air cooled chiller

System Number: CH-1

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
entilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	787.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	37.87	0.00	0.00	
Remote Monitoring, faintenance, Run Time, and Safety Alarms				6.00
faintenance, Run Time,	37.87	787.50	0.00	

	TYPICAL SYSTEM	I POINT A	ND COS	T SUMM/	ARY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
12	Chilled water reset - Large Air Cooled Chiller	0	0	0	4	\$1,133.00
16	Alarms - Chiller	0	0	2	0	\$281.00
43	Chiller demand limiting - Large Air Cooled Chiller	5	0	0	0	\$530.00
	TOTAL:	6	0	3	4	\$2,330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

System Number: CT-1

PREPARED BY: JM.AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0202	BUILDING NAME:	PHYS FITNESS CTR	
	Building UA:	6,674	CONDITIONED SQFT:	51,307

# SYTEM INFORMATION System Type: 26 System Name: Pump

TYPICAL BUILD	NG INFORMATION	N			
Catagory Number:	Construction:	Us	e:	Occupancy HRS:	Occupancy Days:
1	6 BRICK AND CMU	GY	MNASIUM	0600-2200	M-F; SAT-SUN
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

SYSTEM OPERA	TING S	CHEDU	LE .					
	SUN:	MON:	TUE:		THUR:	FRI:	SAT:	
PRES START:	0	0	0	0	0	0	0.	
PRES STOP:	24	24	24	24	24	24	24	
REQ START:	9	6	. 6	6	6	6	9	
REQ STOP:	21	22	22	22	22	22	21	

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,080	3,360
HTG HRS ON:	3,328	5,376
H/C HRS ON:	5,423	8,760
CLG HRS SAVED:	1,280	7
HTG HRS SAVED:	2,048	
C/H HRS SAVED:	3,337	:

<u>CONSTANTS</u>	
HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
НОАОН:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM.AJN/AMS

BLDG: 0202 BUILDING NAME: PHYS FITNESS CTR
ENERGY CALCULATION SUMMARY

System Type: 26
System Name: Pump
System Number: CT-1

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	2,263.19	0.00
Opt ST/SP	0.00	206.85	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	2,470.04	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	2,470.04	0:00 3.00

IMCS	TYPICAL SYSTEM	POINTA	(ND COS	1 OUNIMA	MAI.	
INCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM.AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0202	BUILDING NAME:	PHYS FITNESS CTR

Building UA: 6,674 CONDITIONED SQFT: 51,307

SYTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit

System Number: UH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	16 BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

SYSTEM OPERATING SCHEDULE

Weeks of Summer:

****	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	21	22	22	22	22	22	21

<u>NPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,000
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	. 0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT HR/YR
	HR/YR	
CLG HRS ON:	2,080	3,360
HTG HRS ON:	3,328	5,376
H/C HRS ON:	5,423	8,760
CLG HRS SAVED	1,280	, )
HTG HRS SAVED	2,048	5.
C/H HRS SAVED	3,337	7

	<u>ONSTANTS</u>
20.	HOAUHC:
33.	HOAUH:
0.00021	COAUHC:
0.00056	COAUC:
27.	HOAOHC:
44.	HOAOH:
0.00039	COAOHC:
0.0010	COAOC:
0.1	DC DUTY:
0.1	DC DEMAND:
0.00002	ECC:
0.000008	ECHC:
0.00063	NSUCHC:
0.0016	NSUCC:
0.000014	DDCCHC:
0.000037	DDCCC:
42500	NSC:
1100	DDCH:
30	OPT:
17.	CHWR:
	CNWR:
5.6	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 16-Sep-95
PREPARED BY: JM.AJN/AMS

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

BLDG: 0202 BUILDING NAME: PHYS FITNESS CTR

CALCILL	

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	UH-1

FUNCTION :	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	2,477.53	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	453.83	
Sub Total	0.00	2,846.49	453.83	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	11.75	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: JM.AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0202	BUILDING NAME:	PHYS FITNESS CTR	
	Building UA:	6,674	CONDITIONED SQFT:	51,307

SYTEM INFORMATION	
System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	UH-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	6 BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	21	22	22	22	22	22	21

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,000
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,080	3,360
HTG HRS ON:	3,328	5,376
H/C HRS ON:	5,423	8,760
CLG HRS SAVED:	1,280	
HTG HRS SAVED:	2,048	:
C/H HRS SAVED:	3,337	:

<u>CONSTANTS</u>	
HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
нолон:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: JM.AJN/AMS

**DATE**: 16-Sep-95

BUILDING NAME: PHYS FITNESS CTR

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit

System Number: UH-2

0202

BLDG:

FUNCTION *	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	2,477.53	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	453.83	
Sub Total	0.00	2,846.49	453.83	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	11.75	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:		3.0
TOTAL	0.00	2,846.49	465.58	3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #:** DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM.AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0202	BUILDING NAME	: PHYS FITNESS CTR	
	Building UA:	6,674	CONDITIONED SQFT:	51,307

#### SYTEM INFORMATION \*\*

System Type: 16

System Name: Heating and Ventilating Unit

System Number: UH-3

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days
1	6 BRICK AND CMU		GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	. 0	0	0	. 0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	21	22	22	22	22	22	21

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	5,750
CFM-CLG:	0
%OA:	0%
%Area:	11%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		PRESENT
	HR/YR	HR/YR
CLG HRS ON:	2,080	3,360
HTG HRS ON:	3,328	5,376
H/C HRS ON:	5,423	8,760
CLG HRS SAVED:	1,280	
HTG HRS SAVED:	2,048	
C/H HRS SAVED:	3,337	<del>!</del>

<u>CONSTANTS</u>	
HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM.AJN/AMS

BLDG: 0202 BUILDING NAME: PHYS FITNESS CTR

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit

System Number: UH-3

<u>FUNCTION</u>	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	3,133.97	0.00
Opt ST/SP	0.00	466.73	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	312.01
Sub Total	0.00	3,600.69	312.01
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	8.08
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3
TOTAL	0.00	3,600.69	320.09 + 3

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95 LOCATION: FT. RILEY, KS PREPARED BY: JM.AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0202	BUILDING	NAME: PHYS	FITNESS CTR	
	Building UA:	6,674	CON	NDITIONED SQFT:	51,307

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: UH-4

Catagory Number:	ING INFORMATION Construction:	Use:	Occupancy HRS:	Occupancy Days
	6 BRICK AND CMU	GYMNASIUM	0600-2200	Occupancy Days:
	DAICK AIND CIVIO	GTWINASIOW	0000-2200	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	lummer:	20		

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
<b>REQ START:</b>	9	6	6	6	6	6	9
REQ STOP:	21	22	22	22	22	22	21

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,000
CFM-CLG:	8,000
%OA:	0%
%Area:	21%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,080	3,360
HTG HRS ON:	3,328	5,376
H/C HRS ON:	5,423	8,760
CLG HRS SAVED:	1,280	_
HTG HRS SAVED:	2,048	
C/H HRS SAVED:	3,337	

<u>CONSTANTS</u>	•
HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
нолон:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM.AJN/AMS

BLDG: 0202 BUILDING NAME: PHYS FITNESS CTR

ENERGY CALCULATION SUMMARY

System Type:

System Name: Heating and Ventilating Unit

System Number: UH-4

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	2,477.53	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	595.65	
Sub Total	0.00	2,846.49	595.65	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	15.42	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM.AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0202	BUILDING NAME:	PHYS FITNESS CTR	
	Building UA:	6,674	CONDITIONED SQFT:	51,307

## SYTEM INFORMATION "

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	UH-5

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1	6 BRICK AND CMU		GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

J.), v.), (p. 5. 3. 3. 3. 5. 5. 1965) 2527966289** v	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0.	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	21	22	22	22	22	22	21

INPUTS	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,000
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,080	3,360
HTG HRS ON:	3,328	5,376
H/C HRS ON:	5,423	8,760
CLG HRS SAVED:	1,280	1
HTG HRS SAVED:	2,048	
C/H HRS SAVED:	3,337	1

<u>CONSTANTS</u>	,
HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
НОАОНС:	27.8
НОАОН:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM.AJN/AMS

BUILDING NAME: PHYS FITNESS CTR

## ENERGY CALCULATION SUMMARY

System Type: 16

BLDG: 0202

System Name: Heating and Ventilating Unit

System Number: UH-5

<u>kW/yr</u>	kWh/yr	MBtu/yr	<u>MH/yr</u>
0.00	2,477.53	0.00	
0.00	368.97	0.00	-
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	453.83	
0.00	2,846.49	453.83	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	11.75	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         2,477.53           0.00         368.97           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         2,477.53         0.00           0.00         368.97         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         453.83           0.00         2,846.49         453.83           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         11.75           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

MCS NCTI NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

## BUILDING 203 CALVARY MUSEUM

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 09-Dec-95

PREPARED BY: JM/AMS/AJN

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0203	BUILDING NAME:	CAVALRY MUSEUM	

Building UA: 2,265 CONDITIONED SQFT: 5,800

#### SYTEM INFORMATION

System Type: 14

System Name: Large Single Zone air handling unit with Humidification

System Number: AHU-1

## TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BL	OCK	ADMINISTRATION	0700-1700	M-F
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	. 0	16	16	16	16	16	0

5.00	Motor HP:
0.82	HP Effic:
0.80	Load Factor:
5,200	CFM-HTG:
5,200	CFM-CLG:
20%	%OA:
100%	%Area:
0	CHILLER CAP (TONS):
0.00	KW-TON:
0	BLR CAP INPUT (BTUH):
0	BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	}
HTG HRS SAVED:	3,936	<b>:</b> i∵
C/H HRS SAVED:	6,414	

	<u>ONSTANTS</u>
27.8	HOAUHC:
44.6	HOAUH:
0	COAUHC:
0	COAUC:
40.4	HOAOHC:
65	НОАОН:
0.000877	COAOHC:
0.00232	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0000629	ECC:
0.0000238	ECHC:
0.000609	NSUCHC:
0.00161	NSUCC:
0.000411	DDCCHC:
0.00109	DDCCC:
131000	NSC:
43100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 09-Dec-95

PREPARED BY: JM/AMS/AJN

BLDG: 0203 BUILDING NAME: CAVALRY MUSEUM

**ENERGY CALCULATION SUMMARY** 

System Type: 14

System Name: Large Single Zone air handling unit with Humidification

System Number: AHU-1

<u>FUNCTION</u>	kW/yr	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	23,453.55	185.43
Opt ST/SP	0.00	1,115.34	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	20,310.50	296.72
Sub Total	0.00	44,879.39	482.14
Economizer	0.00	290.39	0.00
Ventilation/Recirculation	0.00	0.00	8.82
DDC Control	0.00	5,014.79	97.62
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:	5
TOTAL	- 0.00	50,184.57	588.58

	TYPICAL SYSTEM	POINT A	IND COS	T SUMM/	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	O	1	\$348.00
31	Direct digital control - AHU w/ Space Humidity Control	0	3	0	5	\$1,849.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	4	1	8	\$2,980.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0203	<b>BUILDING NAME:</b>	CAVALRY MUSEUM
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**Building UA:** 2,265 CONDITIONED SQFT: 5,800

#### SYTEM INFORMATION

System Type: 7

System Name: Large air cooled chiller

System Number: CH-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter: 3	<b>2</b> :		
Weaks of 9	Summer: 2	¬.		

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0:	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.72
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	60
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	: 
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

	<u>CONSTANTS</u>
27.8	HOAUHC:
44.6	HOAUH:
0	COAUHC:
0	COAUC:
40.4	нолонс:
65	ноаон:
0.000877	COAOHC:
0.00232	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0000629	ECC:
0.0000238	ECHC:
0.000609	NSUCHC:
0.00161	NSUCC:
0.000411	DDCCHC:
0.00109	DDCCC:
131000	NSC:
43100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95 LOCATION: FT. RILEY, KS PREPARED BY: JM/AMS/AJN

EMC NO: 1406-001

BUILDING NAME: CAVALRY MUSEUM BLDG: 0203

## ENERGY CALCULATION SUMMARY

System Type: System Name: Large air cooled chiller

CH-1 System Number:

0.00	6,159.98	^ ^^	
	0,109.90	0.00	
0.00	763.74	0.00	
0.00	0.00	0.00	
1.92	0.00	0.00	
0.00	0.00	0.00	
1.92	6,923.71	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	1,050.00	0.00	
0.00	0.00	0.00	
50.49	0.00	0.00	
	:		6.0
	1.92 0.00 1.92 0.00 0.00 0.00 0.00 0.00 0.00	1.92     0.00       0.00     0.00       1.92     6,923.71       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     1,050.00       0.00     0.00       50.49     0.00	1.92     0.00     0.00       0.00     0.00     0.00       1.92     6,923.71     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     1,050.00     0.00       0.00     0.00     0.00       50.49     0.00     0.00

	TYPICAL SYSTEM POINT AND COST SUMMARY					
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	O	\$386.00
12	Chilled water reset - Large Air Cooled Chiller	0	0	0	4	\$1,133.00
16	Alarms - Chiller	0	0	2	0	\$281.00
43	Chiller demand limiting - Large Air Cooled Chiller	5	0	0	0	\$530.00
	TOTAL:	6	O	3	4	\$2,330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95 PREPARED BY: JM/AMS/AJN

LOCATION: FT. RILEY, KS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0203	BUILDING I	NAME:	CAVALRY MUSEUM	
	Building UA:	2,265	-	CONDITIONED SQFT:	5,800
SYTEM	INFORMATION	*	•		
	System Type: 26				
	System Name: Pump	Y-7-2			
	System Number: CIA/D 1		-		

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:	32		
Weeks of	Summer: 2	20		

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

3.00	Motor HP:
0.79	HP Effic:
0.80	Load Factor:
0	CFM-HTG:
0	CFM-CLG:
0%	%OA:
0%	%Area:
0	CHILLER CAP (TONS):
0.00	KW-TON:
0	BLR CAP INPUT (BTUH):
0	BLR CAP OUTPUT (BTUH):

		PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	, i 
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	•

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
ОРТ:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

BLDG: 0203		BUILDING NAM	E: CAVALRY MUSEUM
	EN	IERGY CALCUL	ATION SUMMARY
System Type:	26		
System Name:	Pump		
System Number:	CWP-1		

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	5,575.17	0.00
Opt ST/SP	0.00	691.23	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.73	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	1.73	6,266.40	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring,			3.00
Maintenance, Run Time, and Safety Alarms:			
TOTAL	1.73	6,266.40	0.00 3.00

UMCS	TYPICAL SYSTEM				<b>(2</b> 011)	
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:					\$386.00

## BUILDING 205 CALVARY MUSEUM

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 09-Dec-95

PREPARED BY: JMAJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0205 BUILDING NAME: CAVALRY MUSEUM

Building UA: 5,291

CONDITIONED SQFT:

16,496

SYSTEM INTERNATION

System Type: 14

System Name: Large Single Zone air handling unit with Humidification

System Number: AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:

4 SANDSTONE BLOCK ADMINISTRATION 0700-1700 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

SUN: MON: TUE: WED: THUR: FRI: SAT: 0 0 0 0 PRES START: 0 0 0 24 24 24 24 24 PRES STOP: 24 24 9 9 9 9 12 9 **REQ START:** 9 17 17 17 17 17 17 **REQ STOP:** 

**INPUTS** 5.00 Motor HP: 0.82 **HP Effic:** 0.80 Load Factor: 11,400 CFM-HTG: CFM-CLG: 11,400 %OA: 15% 65% %Area: 0 CHILLER CAP (TONS): 0.00 KW-TON: **BLR CAP INPUT (BTUH):** 0 0 **BLR CAP OUTPUT (BTUH):** 

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,060	3,360
HTG HRS ON:	1,696	5,376
H/C HRS ON:	2,764	8,760
CLG HRS SAVED:	2,300	1
HTG HRS SAVED:	3,680	ī
C/H HRS SAVED:	5,996	

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
нолон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 09-Dec-95

PREPARED BY: JMAJN/AMS

BLDG: 0205 BUILDING NAME: CAVALRY MUSEUM

ENERGY CALCULATION SUMMARY

System Type: 14

System Name: Large Single Zone air handling unit with Humidification

System Number: AHU-1

FUNCTION	kW/vr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	21,928.12	285.06
Opt ST/SP	0.00	1,115.34	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	41,630.80	450.53
Sub Total	0.00	64,674.26	735.59
Economizer	0.00	749.81	0.00
Ventilation/Recirculation	0.00	0.00	14.50
DDC Control	0.00	12,948.44	148.23
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			5.
TOTAL	0.00	78,372.51	898.31 5.

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	Ö	0	1	\$348.00
	Direct digital control - AHU w/ Space Humidity Control	0	3	0	5	\$1,849.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	4	1	8.	\$2,980.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 09-Dec-95

PREPARED BY: JMAJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

**BLDG**: 0205 **BUILDING NAME: CAVALRY MUSEUM** 

**Building UA:** 5,291 CONDITIONED SQFT:

16,496

SYTEM INFORMATION

System Type: 14

System Name: Large Single Zone air handling unit with Humidification

System Number: AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: **4 SANDSTONE BLOCK** 

**ADMINISTRATION** 0700-1700 M-F

17

17

32 Weeks of Winter: Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

**REQ STOP:** 

SUN: MON: TUE: FRI: SAT: WED: THUR: PRES START: 0 0 0 0 0 0 0 24 PRES STOP: 24 24 24 24 24 24 **REQ START:** 12 9 9 9 9 9 9

17

17

17

17

**INPUTS** Motor HP: 3.00 HP Effic: 0.79 Load Factor: 0.80 CFM-HTG: 6,200 CFM-CLG: 6,200 %OA: 0% %Area: 35% CHILLER CAP (TONS): 0 KW-TON: 0.00 **BLR CAP INPUT (BTUH):** 0 **BLR CAP OUTPUT (BTUH):** 0

17

HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,060	3,360
HTG HRS ON:	1,696	5,376
H/C HRS ON:	2,764	8,760
CLG HRS SAVED:	2,300	]
HTG HRS SAVED:	3,680	•
C/H HRS SAVED:	5,996	<u>:</u>

**CONSTANTS** HOAUHC: 27.8 HOAUH: 44.6 COAUHC: 0 COAUC: 0 HOAOHC: 40.4 HOAOH: 65 COAOHC: 0.000877 COAOC: 0.00232 DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0.0000629 ECHC: 0.0000238 **NSUCHC:** 0.000609 NSUCC: 0.00161 DDCCHC: 0.000411 DDCCC: 0.00109 NSC: 131000 DDCH: 43100 OPT: 305 CHWR: 17.5 CNWR: 0 OAR: 5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 09-Dec-95 PREPARED BY: JMAJN/AMS LOCATION: FT. RILEY, KS

BUILDING NAME: CAVALRY MUSEUM BLDG: 0205

**ENERGY CALCULATION SUMMARY** 

EMC NO: 1406-001

14 System Type:

System Name: Large Single Zone air handling unit with Humidification

AHU-2 System Number:

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtulyr MH/yr
Schedule ST/SP	0.00	13,589.88	0.00
Opt ST/SP	0.00	691.23	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	22,641.31	242.59
Sub Total	0.00	36,922.43	242.59
Economizer	0.00	407.79	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	7,042.13	79.81
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring,			5.00
Maintenance, Run Time, and Safety Alarms	i !		
TOTAL	0.00	44,372.35	322.41 5.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
31	Direct digital control - AHU w/ Space Humidity Control	0	3	0	5	\$1,849.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1.	4	1	8	\$2,980.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0205		BUILDING NAM	E: CAVALRY MUSEUM	
	Building UA:		5,291	CONDITIONED SQFT:	16,496
SYTEM	INFORMATION				And an artist of the state of t
Militaria de Caración de Carac	System Type:	26			MCC NEW CONTRACTOR CAN TO A CANONIC MANAGEMENT AND A CANONIC MANAGEMENT OF STREET AND A CANONIC MANAGEMENT OF S
	System Name:	Pump			
	System Number:	CWP-1			

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
14/	f Winter: 32	<u> </u>		

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: THUR: FRI: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 12 **REQ START:** 9 9 9 9 9 9 17 REQ STOP: 17 17 17 17 17. 17

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	C
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	C
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
LR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,060	3,360
HTG HRS ON:	1,696	5,376
H/C HRS ON:	2,764	8,760
CLG HRS SAVED:	2,300	•
HTG HRS SAVED:	3,680	
C/H HRS SAVED:	5,996	

<u>UNSTANTS</u>	
HOAUHC:	27.
HOAUH:	44.
COAUHC:	
COAUC:	
HOAOHC:	40.
НОАОН:	6
COAOHC:	0.00087
COAOC:	0.0023
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.000062
ECHC:	0.000023
NSUCHC:	0.00060
NSUCC:	0.0016
DDCCHC:	0.00041
DDCCC:	0.0010
NSC:	13100
DDCH:	4310
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BUILDING NAME: CAVALRY MUSEUM

BLDG:	0205		ROILD	ING NA	MIC:	CAVA	ALIX I	MOSEO	IAI
DLDO.					The second second				
		CNICD/	3V (^ /		. O	ION	SIIN	AM AR	<b>Y</b>
to the second second		CHEV	31 Wr	<b>NLUU</b>			UU!!	HILLY TANKS	

 System Type:
 26

 System Name:
 Pump

 System Number:
 CWP-1

FUNCTION	<u>kWiyr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	8,410.78	0.00
Opt ST/SP	0.00	1,115.34	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	2.80	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	2.80	9,526.13	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	2.80	9,526.13	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMMA  DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	O	\$386.00
	TOTAL:	1	0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95 PREPARED BY: JMAJN/AMS

LOCATION: FT. RILEY, KS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0205	BUILDING NAME:	CAVALRY MUSEUM	
	Building UA:	5,291	CONDITIONED SQFT:	16,496

#### SYTEM INFORMATION ......

System Type: 26 System Name: Pump System Number: HWP-1

	ING INFORMATION	A Miles and Sole—ex-		
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks of	f Winter: 3	<del>2</del> '		
Weeks of S	Summer: 2	<u> </u>		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	12	9	9	9	9	9	9
REQ STOP:	17	17	17	17	17	17	17

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,060 3,360 HTG HRS ON: 1,696 5,376 H/C HRS ON: 2,764 8,760 2,300 CLG HRS SAVED: HTG HRS SAVED: 3,680 C/H HRS SAVED: 5,996

INDIMINIO	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
НОАОНС:	40.4
нолон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JMAJN/AMS

BLDG: 0205 BUILDING NAME: CAVALRY MUSEUM

# ENERGY CALCULATION SUMMARY

 System Type:
 26

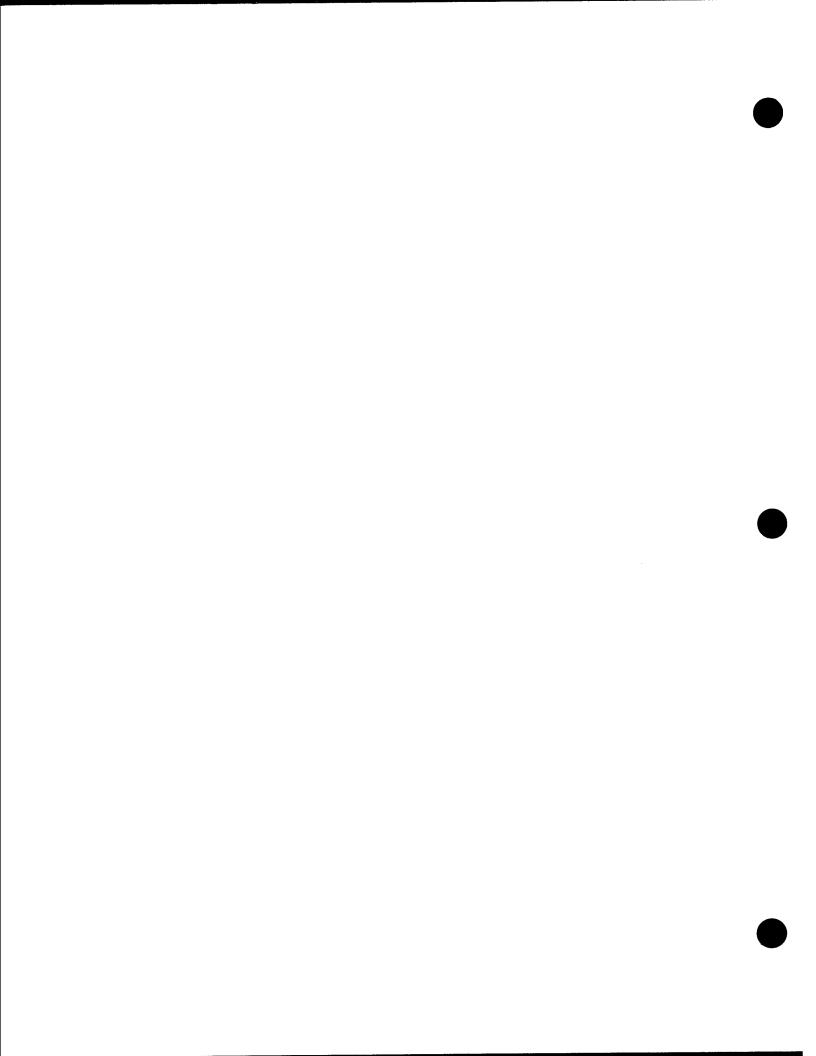
 System Name:
 Pump

 System Number:
 HWP-1

<b>FUNCTION</b>	kW/yr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	8,340.09	0.00
Opt ST/SP	0.00	691.23	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	9,031.32	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	!		3.00
TOTAL	0.00	9,031.32	0.00 3.0

UMCS	TYPICAL SYSTEM	POINT A	ND COST	T SUMMA Di	AI	COST
FUNCTN NO.	UMCS APPLICATION	POINTS	POINTS	POINTS	POINTS	
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

## BUILDING 206 THEATER W/O DRESSING ROOM



PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0206 BUILDING NAME: ADMIN GEN PURP

Building UA: 3,088

CONDITIONED SQFT: 10,754

## SYTEM INFORMATION

System Type: 13

System Name: Large Single Zone air handling unit

System Number: AHU-1

TYPICAL BUILD	ING INFORMATIO	M	file of the second		
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
2	0 BRICK AND CMU		THEATER	1700-2400	TH-F;SAT-SUN
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

RIBETE MEKATUKUNTUNTUK 1901.	
5.00	Motor HP:
0.82	HP Effic:
0.80	Load Factor:
13,500	CFM-HTG:
13,500	CFM-CLG:
15%	%OA:
100%	%Area:
C	CHILLER CAP (TONS):
0.00	KW-TON:
C	BLR CAP INPUT (BTUH):
С	BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	 ) ,
HTG HRS SAVED:	3,616	5
C/H HRS SAVED:	5,892	- -

HOAUHC:	26.
HOAUH:	42.
COAUHC:	0.00058
COAUC:	0.0015
HOAOHC:	29.
НОАОН:	46.
COAOHC:	0.0025
COAOC:	0.0066
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00049
ECHC:	0.00018
NSUCHC:	0.00047
NSUCC:	0.0012
DDCCHC:	0.00069
DDCCC:	0.0018
NSC:	20200
DDCH:	11600
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/DEJ

BLDG: 0206 BUILDING NAME: ADMIN GEN PURP

ENERGY CALCULATION SUMMARY

System Type: 13

System Name: Large Single Zone air handling unit

System Number: AHU-1

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	28,574.46	317.38
Opt ST/SP	0.00	1,115.34	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	7.46	0.00	0.00
Night Setback	0.00	37,862.91	623.78
Sub Total	7.46	67,552.72	941.16
Economizer	0.00	7,278.62	0.00
Ventilation/Recirculation	0.00	363.78	16.43
DDC Control	0.00	27,062.53	358.21
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		,	5
TOTAL	7.46	102,257.65	1,315.79 * 5.

	TYPICAL SYSTEM	POINT A	ND COS	T SUMM/	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
26	Direct digital control - Large SZ AHU	0	2	0	4	\$1,281.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	3	1	7	\$2,412.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 09-Dec-95

## PREPARED BY: AJN/DEJ

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0206	BUILDING NAME:	ADMIN GEN PURP
	~		

Building UA: 3,088 COND

CONDITIONED SQFT: 10,754

#### SYTEM INFORMATION

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

#### TYPICAL BUILDING INFORMATION

Catagory Number: Construction:	Use:	Occupancy HRS:	Occupancy Days:
20 BRICK AND CMU	THEATER	1700-2400	TH-F;SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

SOCIOLOS UM ANTICONOMICA ANTICONOMICA ANTICOMO ANTICOMO ANTICONOMICA ANTICOMO ANTICO	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17.	0

INPUTS	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	982,500
BLR CAP OUTPUT (BTUH):	786,000

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

<u>CONSTANTS</u>	1000
HOAUHC:	26.6
HOAUH:	42.7
COAUHC:	0.000589
COAUC:	0.00156
нолонс:	29.2
ноаон:	46.9
COAOHC:	0.00251
COAOC:	0.00664
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000496
ECHC:	0.000188
NSUCHC:	0.000476
NSUCC:	0.00126
DDCCHC:	0.000699
DDCCC:	0.00185
NSC:	202000
DDCH:	116000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ

BLDG:	0206	BUILDING NAME: ADMIN GEN PURP
		ENERGY CALCULATION SUMMARY
System T	vna.	3

System Type: 3
System Name: Small steam boiler
System Number: BLR-1

<u>FUNCTION</u>	kW/yr k	<u>Mh/yr</u> M	Btulyr MH/yr	Į.
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	AN VICE OF THE STATE OF THE STA			4.00
TOTAL	0.00	0.00	0.00	4.00

	TYPICAL SYS	TEM POINT AN	ND COS	T SUMMA	RY	
UMCS FUNCT		DO	AO	DI	ΑĪ	COST
NO.		IN THE WAY SHARE THE WAY THE STATE OF	CANADA DE PARA DE MARIA	POINTS	POINTS	
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TOT/	11.	n			\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0206	BUILDING NAME:	ADMIN GEN PURP	
[	Building UA:	3.088	CONDITIONED SQFT:	10,754

SYTEM INFORMATION	CONTRACTOR CONTRACTOR
System Type:	7
System Name:	Large air cooled chiller
System Number	CH-1

Catagory Number:	Construction:	U	lse:	Occupancy HRS:	Occupancy Days:
	OBRICK AND CMU	Т	HEATER	1700-2400	TH-F;SAT-SUN
Weeks of	Winter:	32			
Weeks of S	iummer:	20			

## SYSTEM OPERATING SCHEDULE

A ANDRONE OF THE PROPERTY OF T	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

	APPROXICATION AND AND AND AND AND AND AND AND AND AN
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	50
KW-TON:	1.10
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR 3,360 CLG HRS ON: 900 5,376 HTG HRS ON: 1,440 8,760 H/C HRS ON: 2,346 CLG HRS SAVED: 2,460 HTG HRS SAVED: 3,936 C/H HRS SAVED: 6,414

CONSTANTS	•
HOAUHC:	26.6
HOAUH:	42.7
COAUHC:	0.000589
COAUC:	0.00156
HOAOHC:	29.2
HOAOH:	46.9
COAOHC:	0.00251
COAOC:	0.00664
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000496
ECHC:	0.000188
NSUCHC:	0.000476
NSUCC:	0.00126
DDCCHC:	0.000699
DDCCC:	0.00185
NSC:	202000
DDCH:	116000
OPT:	305
CHWR:	17.5
CNWR:	(
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: AJN/DEJ

LOCATION: FT. RILEY, KS

BUILDING NAME: ADMIN GEN PURP

ENERGY CALCULATION SUMMARY

System Type: 7

0206

BLDG:

System Name: Large air cooled chiller

System Number: CH-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	875.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	42.08	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				6.0
TOTAL	42.08	875.00	0.00	6.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO POINTS	T SUMMA  DI POINTS	ARY AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
12	Chilled water reset - Large Air Cooled Chiller	0	0	0	4	\$1,133.00
16	Alarms - Chiller	0	0	2	0	\$281.00
43	Chiller demand limiting - Large Air Cooled Chiller	5	0	0	0	\$530.00
	TOTAL:	6	0	3	4	\$2,330.00

# BUILDING 207 CALVARY MUSEUM

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO:** 1406-001 **DATE:** 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY:

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0207 BUILDING NAME: CAVALRY MUSEUM

Building UA: 2,655 CONDITIONED SQFT: 8,278

SYTEM INFORMATION

System Type: 14

System Name: Large Single Zone air handling unit with Humidification

System Number: AHU-1

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:
4 SANDSTONE BLOCK ADMINISTRATION 0700-1700 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

SUN: MON: TUE: WED: THUR: FRI: SAT: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 **REQ START:** 13 10 10 10 10 10 10 **REQ STOP:** 16 16 16 16 16 16 16

**INPUTS** Motor HP: 1.00 HP Effic: 0.69 Load Factor: 0.80 CFM-HTG: 650 CFM-CLG: 650 %OA: 10% 17% %Area: CHILLER CAP (TONS): 0 KW-TON: 0.00 **BLR CAP INPUT (BTUH):** 0 **BLR CAP OUTPUT (BTUH):** 0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	780	3,360
HTG HRS ON:	1,248	5,376
H/C HRS ON:	2,034	8,760
CLG HRS SAVED:	2,580	
HTG HRS SAVED:	4,128	

6,726

C/H HRS SAVED:

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
нолон:	65
СОАОНС:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 09-Dec-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 0207 BUILDING NAME: CAVALRY MUSEUM

ENERGY CALCULATION SUMMARY

System Type: 14

System Name: Large Single Zone air handling unit with Humidification

System Number: AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	5,801.06	12.15
Opt ST/SP	0.00	263.04	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	2,662.66	59.13
Sub Total	0.00	8,726.76	71.28
Economizer	0.00	31.46	0.00
Ventilation/Recirculation	0.00	0.00	0.55
DDC Control	0.00	543.27	19.45
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring,			5
Maintenance, Run Time,			
and Safety Alarms			91 29 5.
TOTAL	0.00	9,301.48	91:29

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O O	0	1	\$348.00
31	Direct digital control - AHU w/ Space Humidity Control	0	3	0	5	\$1,849.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	. 1	4	1	8	\$2,980.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO:** 1406-001 **DATE:** 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY:

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0207 BUILDING NAME: CAVALRY MUSEUM

Building UA: 2,655 CONDITIONED SQFT: 8,278

## SYTEM INFORMATION

System Type: 14

System Name: Large Single Zone air handling unit with Humidification

System Number: AHU-2

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

96/000000 - 10 - 10 - 10 - 10 - 10 - 10 -	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	13	10	10	10	10	10	10
REQ STOP:	16	16	16	16	16	16	16

#### INPUTS 1.00 Motor HP: HP Effic: 0.69 0.80 Load Factor: 1,515 CFM-HTG: 1,515 CFM-CLG: 10% %OA: 17% %Area: 0 CHILLER CAP (TONS): 0.00 KW-TON: 0 BLR CAP INPUT (BTUH): 0 BLR CAP OUTPUT (BTUH):

## HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	780	3,360
HTG HRS ON:	1,248	5,376
H/C HRS ON:	2,034	8,760
CLG HRS SAVED:	2,580	
HTG HRS SAVED:	4,128	: :
C/H HRS SAVED:	6,726	1

#### **CONSTANTS** 27.8 HOAUHC: 44.6 HOAUH: Õ COAUHC: 0 COAUC: HOAOHC: 40.4 HOAOH: 65 0.000877 COAOHC: 0.00232 COAOC: DC DUTY: 0.17 0.17 DC DEMAND: ECC: 0.0000629 ECHC: 0.0000238 NSUCHC: 0.000609 0.00161 **NSUCC:** DDCCHC: 0.000411 0.00109 DDCCC: NSC: 131000 DDCH: 43100 305 OPT: 17.5 CHWR: 0 CNWR: 5.67 OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 0207

**BUILDING NAME: CAVALRY MUSEUM** 

## **ENERGY CALCULATION SUMMARY**

System Type: 14

Large Single Zone air handling unit with Humidification System Name:

AHU-2 System Number:

FUNCTION	<u>kWiyr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,801.06	28.33	- 1000
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	6,206.04	59.13	
Sub Total	0.00	12,270.14	87.46	
Economizer	0.00	73.32	0.00	
Ventilation/Recirculation	0.00	0.00	1.28	
DDC Control	0.00	1,266.23	19.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		1		5.0

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	ARY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	Ö	1	\$348.00
31	Direct digital control - AHU w/ Space Humidity Control	0	3	0	5	\$1,849.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	4	4	1	8	\$2,980.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY:

## **ENERGY CALCULATION PARAMETERS**

UM
U

**Building UA:** 2,655 CONDITIONED SQFT:

8,278

#### SYTEM INFORMATION

System Type: 14

System Name: Large Single Zone air handling unit with Humidification

System Number: AHU-3

### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
4	SANDSTONE B	LOCK	ADMINISTRATION	0700-1700	M-F
Weeks of	Winter:	32			
Weeks of Su	ımmer:	20			

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	13	10	10	10	10	10	10
REQ STOP:	16	16	16	16	16	16	16

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,050
CFM-CLG:	2,050
%OA:	10%
%Агеа:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (RTUH):	n

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	780	3,360
HTG HRS ON:	1,248	5,376
H/C HRS ON:	2,034	8,760
CLG HRS SAVED:	2,580	ī
HTG HRS SAVED:	4,128	
C/H HRS SAVED:	6,726	

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 09-Dec-95

PREPARED BY:

BLDG: 0207

BUILDING NAME: CAVALRY MUSEUM

ENERGY CALCULATION SUMMARY

System Type:

14

System Name:

Large Single Zone air handling unit with Humidification

System Number: AHU-3

FUNCTION	kW/vr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	8,137.16	38.33
Opt ST/SP	0.00	368.97	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	8,397.61	59.13
Sub Total	0.00	16,903.74	97.46
Economizer	0.00	99.22	0.00
Ventilation/Recirculation	0.00	0.00	1.74
DDC Control	0.00	1,713.39	19.45
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	:	18,716.34	5 

UMCS FUNCTN NO:	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMMA  DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
31	Direct digital control - AHU w/ Space Humidity Control	0	3	0	5	\$1,849.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL	1	4	1	8	\$2,980.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO:** 1406-001 **DATE:** 09-Dec-95

LOCATION: FT. RILEY, KS PREPARED BY:

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0207 BUILDING NAME: CAVALRY MUSEUM

Building UA: 2,655 CONDITIONED SQFT: 8,278

#### SYTEM INFORMATION

System Type: 14

System Name: Large Single Zone air handling unit with Humidification

System Number: AHU-4

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	13	10	10	10	10	10	10
REQ STOP:	16	16	16	16	16	16	16

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	1,950
CFM-CLG:	1,950
%OA:	10%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	780	3,360
HTG HRS ON:	1,248	5,376
H/C HRS ON:	2,034	8,760
CLG HRS SAVED:	2,580	
HTG HRS SAVED:	4,128	i
C/H HRS SAVED:	6,726	1

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 09-Dec-95

PREPARED BY:

BLDG: 0207 BUILDING NAME: CAVALRY MUSEUM

## ENERGY CALCULATION SUMMARY

System Type: 14

System Name: Large Single Zone air handling unit with Humidification

System Number: AHU-4

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr Mi	<del>l/yr</del>
Schedule ST/SP	0.00	8,137.16	36.46	dia ::: N. a
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	7,987.97	55.65	
Sub Total	0.00	16,494.10	92.11	
Economizer	0.00	94.38	0.00	
Ventilation/Recirculation	0.00	0.00	1.65	
DDC Control	0.00	1,629.81	18.31	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:		5.00
TOTAL	0.00	18,218.28	112.08	5.00

	TYPICAL SYSTEM	POINT A	IND COS	T SUMM/	ARY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO- POINTS	DI POINTS	AI POINTS	EOST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
31	Direct digital control - AHU w/ Space Humidity Control	0	3	0	5	\$1,849.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	7.3	1	8	\$2,980.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO:** 1406-001 **DATE:** 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY:

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0207 BUILDING NAME: CAVALRY MUSEUM

Building UA: 2,655

CONDITIONED SQFT:

8,278

## SYTEM INFORMATION

System Type: 14

System Name: Large Single Zone air handling unit with Humidification

System Number: AHU-5

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks o	of Winter: 3	2		

Weeks of Winter: 32
Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	13	10	10	10	10	10	10
REQ STOP:	16	16	16	16	16	16	16

<u>nputs</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,180
CFM-CLG:	2,180
%OA:	10%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# REQUIRED HR/YR PRESENT HR/YR CLG HRS ON: 780 3,360 HTG HRS ON: 1,248 5,376 H/C HRS ON: 2,034 8,760

	-,
CLG HRS SAVED:	2,580
HTG HRS SAVED:	4,128
HIGHRS SAVED.	4,120
C/H HRS SAVED:	6.726

LIOURISTON LOUIS TONS

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 0207 BUILDING NAME: CAVALRY MUSEUM

ENERGY CALCULATION SUMMARY

14 System Type:

Large Single Zone air handling unit with Humidification System Name:

System Number: AHU-5

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	8,137.16	40.76	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	8,930.14	59.13	
Sub Total	0.00	17,436.27	99.89	
Economizer	0.00	105.51	0.00	
Ventilation/Recirculation	0.00	0.00	1.85	
DDC Control	0.00	1,822.04	19.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	, , , , , , , , , , , , , , , , , , , ,
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	0.00	19,363.82	121.19	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY						
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
31	Direct digital control - AHU w/ Space Humidity Control	0	3	0	5	\$1,849.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	11	4	-1	8	\$2,980.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 09-Dec-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY:

0

**ENERGY CALCULATION PARAMETERS** 

BLDG:	0207		BUILDING	NAME:	CAVALRY MUSEUM	
	Building UA:		2,655		CONDITIONED SQFT:	8,278
SYTEM	INFORMATION					
	System Type:	14	encidenciae ( ) como il responsable como surviver di distinti di compandicio in montro con	accepted to any in consumption of the con-		Solder (State Cont. Cont. ) - Amount - Ambrer of State (State Cont. Cont
	System Name:	Large Singl	e Zone air handling	unit with H	umidification	
	System Number:	AHILE				

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLC	CK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: FRI: SAT: PRES START: 0 0 0 0 0 0 PRES STOP: 24 24 24 24

24 **REQ START:** 13 10 10 10 10 10 10 16 16 REQ STOP: 16 16 16 16 16

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,145
CFM-CLG:	2,145
%OA:	10%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

COURS CALCULAT	IONS	
	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	780	3,360
HTG HRS ON:	1,248	5,376
H/C HRS ON:	2,034	8,760
CLG HRS SAVED:	2,580	]
HTG HRS SAVED:	4,128	:
C/H HRS SAVED:	6,726	

<u>CONSTANTS</u>	Ski yaz baya
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

CNTRCT #: DACA 01-94-D-0033

**EMC NO**: 1406-001 **DATE**: 09-Dec-95

PREPARED BY:

BLDG: 0207 BUILDING NAME: CAVALRY MUSEUM

ENERGY CALCULATION SUMMARY

System Type: 14

System Name: Large Single Zone air handling unit with Humidification

System Number: AHU-6

- FUNCTION	<u>kW/vr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	8,137.16	40.11
Opt ST/SP	0.00	368.97	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	8,786.77	55.65
Sub Total	0.00	17,292.90	95.76
Economizer	0.00	103.82	0.00
Ventilation/Recirculation	0.00	0.00	1.82
DDC Control	0.00	1,792.79	18.31
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		19,189.50	5.0° 115.89° 5.0°

TYPICAL SYSTEM POINT AND COST SUMMARY						
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
31	Direct digital control - AHU w/ Space Humidity Control	0	3	0	5	\$1,849.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
g.	TOTAL:		4'	1	8	\$2,980.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0207	<b>BUILDING NAME:</b>	CAVALRY MUSEUM
	<b></b>		

Building UA: 2,655 CONDITIONED SQFT: 8,278

#### SYTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

# TYPICAL BUILDING INFORMATION

 Catagory Number:
 Construction:
 Use:
 Occupancy HRS:
 Occupancy Days:

 4 SANDSTONE BLOCK
 ADMINISTRATION
 0700-1700
 M-F

Weeks of Winter: 32
Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

SUN: MON: TUE: THUR: FRI: SAT: WED: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24: 24 **REQ START:** 13 10 10 10 10 10 10 **REQ STOP:** 16 16 16 16 16 16 16

## <u>INPUTS</u>

Motor HP:	1.50
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	63%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	525,000
BLR CAP OUTPUT (BTUH):	420,000

## HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	780	3,360
HTG HRS ON:	1,248	5,376
H/C HRS ON:	2,034	8,760
CLG HRS SAVED:	2,580	3
HTG HRS SAVED:	4,128	
C/H HRS SAVED:	6,726	- i.

## <u>CONSTANTS</u>

27.8	HOAUHC:
44.6	HOAUH:
0	COAUHC:
0	COAUC:
40.4	HOAOHC:
65	НОАОН:
0.000877	COAOHC:
0.00232	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0000629	ECC:
0.0000238	ECHC:
0.000609	NSUCHC:
0.00161	NSUCC:
0.000411	DDCCHC:
0.00109	DDCCC:
131000	NSC:
43100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

**BUILDING NAME: CAVALRY MUSEUM** BLDG: 0207 

ENERGY CALCULATION SUMMARY

System Type:

System Name: Small hot water boiler

System Number: BLR-1

<u>FUNCTION</u>	(W/yr	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	5,355.63	0.00	143001511
Opt ST/SP	0.00	395.70	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	5,751.34	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.98	*******
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		;		4.0
TOTAL	0.00	5,751.34	2.98	4.00

UMCS	TYPICAL SYSTEN	I POINT A	ND COS	T SUMMA	\RY	
FUNCTN NO:	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	O	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0207		BU	ILDING NAME:	CAVALRY MUSEUM	
	Building UA:	2,65	5	CONDITIONED SQFT:	8,278
SYTEM	INFORMATION				
	System Type:	7			COMMAN TO SEAL A LINE LONG A SECURE OF SECURIOR
	System Name:	Large air cooled chiller			
	System Number:	CH-1			

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE B	LOCK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	O.	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	13	10	10	10	10	10	10
REQ STOP:	16	16	16	. 16	16	16	16

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.71
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	780	3,360
HTG HRS ON:	1,248	5,376
H/C HRS ON:	2,034	8,760
CLG HRS SAVED:	2,580	
HTG HRS SAVED:	4,128	<b>Š</b> .
C/H HRS SAVED:	6,726	;

<u>ONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

BLDG: 0207

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

PREPARED BY:

LOCATION: FT. RILEY, KS

**BUILDING NAME: CAVALRY MUSEUM** 

## ENERGY CALCULATION SUMMARY

System Type: 7
System Name: Large air cooled chiller
System Number: CH-1

FUNCTION	<u>kWlyr</u>	<u>kWh/yr</u>	MBtulyr MH/yr
Schedule ST/SP	0.00	4,337.31	0.00
Opt ST/SP	0.00	512.74	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.29	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	1.29	4,850.05	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	525.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	25.25	0.00	0.00
Remote Monitoring, Maintenance, Run Time,			6.0
and Safety Alarms TOTAL	26.53	5,375.05	0.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	ÃO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
12	Chilled water reset - Large Air Cooled Chiller	0	0	0	4	\$1,133.00
16	Alarms - Chiller	0	0	2	0	\$281.00
43	Chiller demand limiting - Large Air Cooled Chiller	5	0	0	0	\$530.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0207		BUILDING N	AME: CAVALR	Y MUSEUM	
	Building UA:		2,655	COND	TIONED SQFT:	8,278
SYTEM	INFORMATION			1	en e	
***************************************	System Type:	26				a distanting programment of the state of the
	System Name:	Pump				
	System Number:	CWP-1				

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days
	4 SANDSTONE BLO	OCK	ADMINISTRATION	0700-1700	M-F
Weeks of	Winter:	32			
Weeks of S	iummer:	20			

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	13	10	10	10	10	10	10
REQ STOP:	16	16	16	16	16	16	16

NFUI3	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	780	3,360
HTG HRS ON:	1,248	5,376
H/C HRS ON:	2,034	8,760
CLG HRS SAVED:	2,580	-   
HTG HRS SAVED:	4,128	7. 1
C/H HRS SAVED:	6,726	

	that differential and resident they as you apply a first of the
HOAUHC:	27.
HOAUH:	44.
COAUHC:	
COAUC:	
HOAOHC:	40
НОАОН:	6
COAOHC:	0.00087
COAOC:	0.0023
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.000062
ECHC:	0.000023
NSUCHC:	0.00060
NSUCC:	0.0016
DDCCHC:	0.00041
DDCCC:	0.0010
NSC:	13100
DDCH:	4310
OPT:	30
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY:

BLDG: 0207 BUILDING NAME: CAVALRY MUSEUM

ENERGY CALCULATION SUMMARY

System Type: 26
System Name: Pump
System Number: CWP-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtwyr	<u>MH/yr</u>
Schedule ST/SP	0.00	3,948.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.17	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	1.17	4,414.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00

	TYPICAL SYSTEM	I POINT A	ND COS	TSUMM	\RY	150.20
UMCS FUNCTI NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	77	Ö	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0207	BUIL	DING NAME:	CAVALRY MUSEUM	
	Building UA:	2,655		CONDITIONED SQFT:	8,278

STEMPHEORMATION	Physics Committee of the Committee of th
System Type:	26
System Name:	Pump
System Number:	HWP-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	13	10	10	10	10	10	10
REQ STOP:	16	16	16	16	16	16	16

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Агеа:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR	
CLG HRS ON:	780	3,360	
HTG HRS ON:	1,248	5,376	
H/C HRS ON:	2,034	8,760	
CLG HRS SAVED:	2,580	•	
HTG HRS SAVED:	4,128	1	
C/H HRS SAVED:	6,726	•	

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BUILDI	NG NAME:	CAVALRY M	USEUM		
ENERGY CA	LCULAT	TON SUMN	IARY	-	
26					
Pump					
HWP-1					
	ENERGY CA 26 Pump	ENERGY CALCULAT  26  Pump	ENERGY CALCULATION SUMN  26  Pump	ENERGY CALCULATION SUMMARY  26  Pump	ENERGY CALGULATION SUMMARY  26  Pump

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	4,993.76	0.00
Opt ST/SP	0.00	368.97	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	5,362.73	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	5,362.73	0.00 3.00

	TYPICAL SYSTE	M POINT A	ND COS	T SUMM/	<b>NRY</b>	
UMCS FUNCTN	UMCS APPLICATION	DO	AO	DI	AI	COST
NO.		POINTS	POINTS	POINTS	POINTS	
24	Scheduled start/stop control -	1	0	1	0	\$386.00
	Pump; Optimum start/stop - Pump; Demand limiting - Pump					
	TOTAL:	1	0	1	0	\$386.00

# BUILDING 210 MILIT PERSONNEL BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

58,448

**DATE:** 16-Sep-95

**LOCATION: FT. RILEY, KS** 

PREPARED BY: AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0210	BUILDING NAME:	MILIT PERS BLDG

**Building UA:** CONDITIONED SQFT: 10,220

SYSTEM INTO SIMATION:

System Type: 10 System Name: Multizone air handling unit

System Number: AHU-1

#### YPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 4 SANDSTONE BLOCK ADMINISTRATION 0700-1700 M-F

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7.	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	48,000
CFM-CLG:	48,000
%OA:	10%
%Area:	25%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	-
C/H HRS SAVED:	6,153	

<u>CONSTANTS</u>	•
HOAUHC:	27.8
HOAUH:	- 44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
нолон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

BLDG: 0210

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BUILDING NAME: MILIT PERS BLDG

ENERGY CALCULATION SUMMARY

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-1

- KWIYE	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
0.00	42,797.50	821.04	
0.00	2,121.49	0.00	
0.00	0.00	0.00	
14.19	0.00	0.00	
0.00	179,860.32	334.71	
14.19	224,779.31	1,155.74	
0.00	2,978.40	0.00	
0.00	0.00	40.70	
0.00	51,433.71	110.12	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
,		. :	5.0
	0.00 0.00 14.19 0.00 14.19 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         42,797.50           0.00         2,121.49           0.00         0.00           14.19         0.00           0.00         179,860.32           14.19         224,779.31           0.00         2,978.40           0.00         0.00           0.00         51,433.71           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         42,797.50         821.04           0.00         2,121.49         0.00           0.00         0.00         0.00           14.19         0.00         0.00           0.00         179,860.32         334.71           14.19         224,779.31         1,155.74           0.00         2,978.40         0.00           0.00         0.00         40.70           0.00         51,433.71         110.12           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	Ö	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: AJN/AMS

LOCATION: FT. RILEY, KS

## PREPARED DI.

<b>ENERGY</b>	CALCU	LATION P	PARAMETERS
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BLDG:	0210	BUILDING NAME:	MILIT PERS BLDG

Building UA: 10,220 CONDITIONED SQFT: 58,448

#### SYTEM INFORMATION ......

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-2

TYPICAL BUILDING INFORMATION						
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:		
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F		

Weeks of Winter: 32
Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	_7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

#### 10.00 Motor HP: 0.86 HP Effic: 0.80 Load Factor: 38,400 CFM-HTG: 38,400 CFM-CLG: 10% %OA: %Area: 20% 0 **CHILLER CAP (TONS):** 0.00 KW-TON: 0 BLR CAP INPUT (BTUH): 0 **BLR CAP OUTPUT (BTUH):**

#### HOURS CALCULATIONS PRESENT REQUIRED HR/YR HR/YR 3,360 CLG HRS ON: 1,000 5,376 HTG HRS ON: 1,600 H/C HRS ON: 2,607 8,760 CLG HRS SAVED: 2,360 3,776 HTG HRS SAVED: 6,153 C/H HRS SAVED:

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
нолон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

TREFARES

PREPARED BY: AJN/AMS

BLDG: 0210	BUILDING NAME: MILIT PERS BLDG
Service	ENERGY CALCULATION SUMMARY
System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-2

FUNCTION	<u>kW/yr</u>	kWh/yr	<u>MBtulyr</u>	MH/yr
Schedule ST/SP	0.00	42,797.50	656.83	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	143,888.26	267.76	
Sub Total	14.19	188,807.24	924.59	
Economizer	0.00	2,382.72	0.00	
Ventilation/Recirculation	0.00	0.00	32.56	
DDC Control	0.00	41,146.97	88.10	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	:			5.0
TOTAL	14.19	232,336.94	1,045.25	, 5.0

	TYPICAL SYSTEM POINT AND COST SUMMARY									
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST				
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00				
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00				
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00				
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00				
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00				
	TOTAL:	7	8	1	11	\$4,509.00				

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PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0210	BUILDING NA	ME: MILIT PERS BLDG	
	Building UA:	10,220	CONDITIONED SQFT:	58,448

## SYTEM INFORMATION

System Type: 13

System Name: Large Single Zone air handling unit

System Number: AHU-3

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLO	CK	ADMINISTRATION	0700-1700	M-F
Weeks of	Winter:	32			
Weeks of S	lummer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	27,000
CFM-CLG:	27,000
%OA:	10%
%Area:	30%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

## HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	•
HTG HRS SAVED:	3,776	•
C/H HRS SAVED:	6,153	•

ONSTANTS	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95 **PREPARED BY**: AJN/AMS

BUILDING NAME: MILIT PERS BLDG

ENERGY CALCULATION SUMMARY

System Type: 13
System Name: Large Single Zone air handling unit

System Number: AHU-3

BLDG: 0210

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	33,141.02	461.83	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	101,171.43	401.65	
Sub Total	10.99	135,955.27	863.48	
Economizer	0.00	1,675.35	0.00	
Ventilation/Recirculation	0.00	0.00	22.89	
DDC Control	0.00	28,931.46	132.14	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	10.99	166,562.08	1,018.52	. 5.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1 1	\$348.00
26	Direct digital control - Large SZ AHU	0	2	0	4	\$1,281.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95 PREPARED BY: AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0210	BUILDING NAME:	MILIT PERS BLDG
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Building UA: 10,220 CONDITIONED SQFT: 58,448

## SYTEM INFORMATION =

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

## YPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 4 SANDSTONE BLOCK ADMINISTRATION 0700-1700 M-F

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7		7	0
REQ STOP:	0	17	17	. 17	17	17	0

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,000
CFM-CLG:	4,000
%OA:	10%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED	2,360	
HTG HRS SAVED:	3,776	•
C/H HRS SAVED:	6,153	-

	<u>ONSTANTS</u>
27.8	HOAUHC:
44.6	HOAUH:
0	COAUHC:
0	COAUC:
40.4	HOAOHC:
65	НОАОН:
0.000877	COAOHC:
0.00232	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0000629	ECC:
0.0000238	ECHC:
0.000609	NSUCHC:
0.00161	NSUCC:
0.000411	DDCCHC:
0.00109	DDCCC:
131000	NSC:
43100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

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PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/AMS

BLDG: 0210 BUILDING NAME: MILIT PERS BLDG

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	9,415.45	68.42	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	14,988.36	107.11	
Sub Total	3.12	24,870.54	175.53	
Economizer	0.00	248.20	0.00	
Ventilation/Recirculation	0.00	0.00	3.39	
DDC Control	0.00	4,286.14	35.24	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			!	3.00
TOTAL	3.12	29,404.88	214.16	* 3.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMM/	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	<b>1</b>	O	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

58,448

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0210	BUILDING NAME:	MILIT PERS BLDG
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Building UA: 10,220 CONDITIONED SQFT:

#### SYTEM INFORMATION ...

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-5

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 4 SANDSTONE BLOCK ADMINISTRATION 0700-1700 M-F Weeks of Winter: 32

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	<u> </u>	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	5,100
CFM-CLG:	5,100
%OA:	10%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0.
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	ī.
HTG HRS SAVED:	3,776	-  -
C/H HRS SAVED:	6,153	-

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
нолон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS

BLDG: 0210 BUILDING NAME: MILIT PERS BLDG
ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-5

FUNCTION	kW/yr	<u>kWh/yr</u>	<u>MBtu/yr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	13,944.40	87.24	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	19,110.16	66.94	
Sub Total	4.62	33,745.79	154.18	
Economizer	0.00	316.45	0.00	
Ventilation/Recirculation	0.00	0.00	4.32	
DDC Control	0.00	5,464.83	22.02	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			180.52	3.

TYPICAL SYSTEM POINT AND COST SUMMARY						
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0210 B	BUILDING NAME:	MILIT PERS BLDG
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BLDG. 0210 BOILDING NAME. WILLI FERS BLDG

Building UA: 10,220 CONDITIONED SQFT:

58,448

#### SYTEM INFORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-6

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter: 32	 2.		
Weeks of S	Summer: 20	<b>)</b>		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	12,000
CFM-CLG:	12,000
%OA:	10%
%Area:	12%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0.

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	•

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

EMC NO: 1406-001

BUILDING NAME: MILIT PERS BLDG BLDG: 0210 **ENERGY CALCULATION SUMMARY** 

System Type: System Name:

Multizone air handling unit

System Number: AHU-6

<b>FUNCTION</b>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> l	<u>MH/yr</u>
Schedule ST/SP	0.00	22,500.15	205.26	3000 2000 300 and 2000 and 2000 a
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	44,965.08	160.66:	
Sub Total	7.46	68,580.58	365.92	
Economizer	0.00	744.60	0.00	
Ventilation/Recirculation	0.00	0.00	10.17	
DDC Control	0.00	12,858.43	52.86	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		!		5.0

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	<b>NRY</b>	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	8	1	11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS **EMC NO:** 1406-001 **DATE:** 16-Sep-95

PREPARED BY: AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0210 BUILDING NAME: MILIT PERS BLDG

Building UA: 10,220

CONDITIONED SQFT: 58,448

# SYTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number: Construction: Use: Occupancy HRS: Occupancy  ASANDSTONE BLOCK ADMINISTRATION 0700-1700 M-F
4 SANDSTONE BLOCK ADMINISTRATION 0700-1700 M-F

# SYSTEM OPERATING SCHEDULE

100 Marie 1	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

	a germanikan di ber
Motor HP:	5.00
HP Effic:	0.41
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,392,000
BLR CAP OUTPUT (BTUH):	2,033,200

### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	7 1.
C/H HRS SAVED:	6,153	

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	- 44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
нолон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	C
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/AMS

BLDG: 0210

BUILDING NAME: MILIT PERS BLDG

ENERGY CALCULATION SUMMARY

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

27,616.29 2,230.66 0.00 0.00 0.00 29,846.95	0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00	0.00
0.00	0.00
0.00	
	0.00
29,846.95	
	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	13.56
0.00	0.00
0.00	0.00
0.00	0.00
	4.
	29,846.95

UMCS EUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI AI POINTS	COST
	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	O	O	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	<b>3</b>	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0210 BUILDING NAME: MILIT PERS B	LDG
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Building UA: 10,220

CONDITIONED SQFT:

58,448

### SYTEM INFORMATION

System Type: 7

System Name: Large air cooled chiller

System Number: CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	. 0
REQ STOP:	0	17	17	17	17	17	0

<u>inputs</u>	
Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	130
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	-    -
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

<u>ONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
нолонс:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 0210 BUILDING NAME: MILIT PERS BLDG

ENERGY CALCULATION SUMMARY

System Type: 7
System Name: Large air cooled chiller

System Number: CH-1

FUNCTION	<u>kWlyr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	16,415.48	0.00
Opt ST/SP	0.00	2,121.49	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	5.32	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	5.32	18,536.97	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	2,275.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	109.40	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	:		6.
TOTAL	114.72	20,811.97	0.00 6.

	TYPICAL SYSTEM POINT AND COST SUMMARY							
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST		
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	O	1	0	\$386.00		
12	Chilled water reset - Large Air Cooled Chiller	0	0	0	4	\$1,133.00		
16	Alarms - Chiller	0	0	2	0	\$281.00		
43	Chiller demand limiting - Large Air Cooled Chiller	5	0	0	0	\$530.00		
	TOTAL:	6	0	3	4	\$2,330.00		

# BUILDING 211 ADMINISTRATION

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0211	BUILDING NAME: ADMIN

Building UA: 7,180

CONDITIONED SQFT:

41,062

SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
<u> </u>	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Summer:

2000 (2000 C. 200 - 00 (200 - 00 (200 )	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7	7	7	7	7	7	7
REQ STOP:	23	23	23	23	23	23	23

<u>NPUTS</u>				
Motor HP:	0.00			
HP Effic:	0.64			
Load Factor:	0.80			
CFM-HTG:	0			
CFM-CLG:	0			
%OA:	0%			
%Area:	0%			
CHILLER CAP (TONS):	3			
KW-TON:	1.10			
BLR CAP INPUT (BTUH):	0			
BLR CAP OUTPUT (BTUH):	0			

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,240	3,360
HTG HRS ON:	3,584	5,376
H/C HRS ON:	5,840	8,760
CLG HRS SAVED:	1,120	)
HTG HRS SAVED:	1,792	2
C/H HRS SAVED:	2,920	Ď

<u>NSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	C
COAUC:	C
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/DEJ

BLDG: 0211

BUILDING NAME: ADMIN

ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-1

FUNCTION :	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	The state of the s
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	52.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	2.52	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.52	52.50	0.00	3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO	T SUMMA DI POINTS	ARY AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	O	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 DATE: 16-Sep-95

DATE: 16-Sep-9

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0211 BUILDING NAME: ADMIN

Building UA: 7,180

CONDITIONED SQFT:

41,062

SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

TYPICAL BUILDING INFORMATION							
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:			
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F			

Weeks of Winter: 32
Weeks of Summer: 20

6-1995-199-1999-199-199-199-199-199-199-1	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7	7	7	. 7	7	7	7
REQ STOP:	23	23	23	23	23	23.	23

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	14,400
%OA:	30%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,240	3,360
HTG HRS ON:	3,584	5,376
H/C HRS ON:	5,840	8,760
CLG HRS SAVED:	1,120	- )
HTG HRS SAVED:	1,792	· ·
C/H HRS SAVED:	2,920	j

*	<u>ONSTANTS</u>
27.8	HOAUHC:
44.6	HOAUH:
C	COAUHC:
(	COAUC:
40.4	HOAOHC:
65	НОАОН:
0.000877	COAOHC:
0.00232	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0000629	ECC:
0.0000238	ECHC:
0.000609	NSUCHC:
0.0016	NSUCC:
0.00041	DDCCHC:
0.00109	DDCCC:
131000	NSC:
4310	DDCH:
30	OPT:
17.	CHWR:
	CNWR:
5.6	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/DEJ

BLDG: 0211 BUILDING NAME: ADMIN

ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit

System Number: AHU-1

4,061.26 691.23 0.00 0.00 0.00 4,752.49 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	
0.00 0.00 0.00 4,752.49 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00	
0.00 0.00 <b>4,752.49</b> 0.00 0.00	0.00 0 94.06 9 94.06 0 0.00 0 0.00	
0.00 <b>4,752.49</b> 0.00 0.00 0.00	94.06 94.06 0 0.00 0 0.00	
<b>4,752.49</b> 0.00 0.00 0.00	94.06 0 0.00 0 0.00	
0.00 0.00 0.00	0.00	
0.00	0.00	
0.00		
	30.95	
0.00	0.00	
0.00	0.00	
0.00	0.00	
0.00	0.00	
		3.0
	0.00	0.00 0.00 4.752.49 125.00

UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
<ul><li>im start/stop - AHU; Demand</li><li>AHU; Duty Cycling - AHU;</li></ul>	1	0	0	1	\$348.00
digital control - Small SZ AHU	0	2	0	3	\$1,097.00
	0	1	0	0	\$272.00
	0	0	0	2	\$399.00
	uled start/stop control - AHU; um start/stop - AHU; Demand g - AHU; Duty Cycling - AHU; setback - AHU digital control - Small SZ AHU e air damper ventilation and ulation control - AHU te air damper economizer I - AHU	uled start/stop control - AHU; um start/stop - AHU; Demand g - AHU; Duty Cycling - AHU; setback - AHU digital control - Small SZ AHU e air damper ventilation and ulation control - AHU e air damper economizer  0	uled start/stop control - AHU; 1 0 um start/stop - AHU; Demand g - AHU; Duty Cycling - AHU; setback - AHU digital control - Small SZ AHU 0 2 e air damper ventilation and 0 1 ulation control - AHU e air damper economizer 0 0	uled start/stop control - AHU; 1 0 0  um start/stop - AHU; Demand g - AHU; Duty Cycling - AHU; setback - AHU digital control - Small SZ AHU 0 2 0 e air damper ventilation and 0 1 0 ulation control - AHU e air damper economizer 0 0 0	uled start/stop control - AHU;  um start/stop - AHU; Demand  g - AHU; Duty Cycling - AHU;  setback - AHU  digital control - Small SZ AHU 0 2 0 3  e air damper ventilation and 0 1 0 0  ulation control - AHU  e air damper economizer 0 0 0 2

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO**: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0211 BUILDING NAME: ADMIN

Building UA: 7,180

CONDITIONED SQFT:

41,062

SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

TYPICAL BUILD	ING INFORMA	TION	page to the first first		
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BL	OCK	ADMINISTRATION	0700-1700	M-F
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7	7	7	7	7	7	7
REQ STOP:	23	23	23	23	23	23	23

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	2,250
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,240	3,360
HTG HRS ON:	3,584	5,376
H/C HRS ON:	5,840	8,760
CLG HRS SAVED:	1,120	-
HTG HRS SAVED:	1,792	į.
C/H HRS SAVED:	2,920	i i

40-00-00 00 00 00-00 00 00 00 00 00 00 00	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	. (
COAUC:	(
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/DEJ

BLDG: 0211 BUILDING NAME: ADMIN

**ENERGY CALCULATION SUMMARY** 

System Type: 15
System Name: Small Single Zone air handling unit

System Number: AHU-2

0 965.92 0 263.04 0 0.00 6 0.00 0 4,057.20 6 5,286.16 0 317.02 0 0.00 0 5,493.60	4 0.00 0 0.00 0 0.00 0 0.00 6 0.00 2 0.00
0 0.00 6 0.00 0 4,057.20 6 5,286.16 0 317.02 0 0.00	0 0.00 0 0.00 0 0.00 6 0.00 2 0.00 0 0.00
0.00	0 0.00 0 0.00 6 0.00 2 0.00 0 0.00
4,057.20 6 5,286.16 0 317.02 0 0.00	0 0.00 6 0.00 2 0.00 0 0.00
<b>6 5,286.16</b> 0 317.02 0 0.00	6 0.00 2 0.00 0 0.00
0 317.02 0 0.00	0.00 0 0.00
0.00	0 0.00
5,493.60	0.00
	· · · · · · · · · · · · · · · · · · ·
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
	3.00
	0.0

IMCS INCTN NO:	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	Ö	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 09-Dec-95 PREPARED BY: AJN/DEJ

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0211 BUILDING NAME: ADMIN

**Building UA:** 7,180 **CONDITIONED SQFT:** 41,062

### SYTEM INFORMATION .....

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Winter: 32 Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7	7	7	7	7	7	7
REQ STOP:	23	23	23	23	23	23	23

<u>NPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,775,000
BLR CAP OUTPUT (BTUH):	1,420,000

# HÖURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,240	3,360
HTG HRS ON:	3,584	5,376
H/C HRS ON:	5,840	8,760
CLG HRS SAVED:	1,120	•
HTG HRS SAVED:	1,792	<del>.</del> I
C/H HRS SAVED:	2,920	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001 DATE: 09-Dec-95

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ

BLDG: 0211	BUILDING NAME:	ADMIN
	ENERGY CALCULAT	TION SUMMARY
System Type:	3	
System Name:	Small steam boiler	
System Number:	BLR-1	

kW/yr l	cWh/yr I	<u>MBtu/yr</u> MH/y	
0.00	.00	0.00	<u> </u>
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			4.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         .00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         .00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTI No.		DO	ND COST AO POINTS	·DI	RY AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TOTAL:	1	0	3		\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #**: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

**DATE:** 09-Dec-95 PREPARED BY: AJN/DEJ

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0211	BUILDING NAME:	ADMIN	
	Building UA:	7,180	CONDITIONED SQFT:	41,062

# SYTEM INFORMATION :

System Type: 3

System Name: Small steam boiler

System Number: BLR-2

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BL	OCK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:	32			
Weeks of	Summer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7	7	7	7	7	7	7
REQ STOP:	23	23	23	23	23	23	23

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,775,000
BLR CAP OUTPUT (BTUH):	1,420,000

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	2,240	3,360
HTG HRS ON:	3,584	5,376
H/C HRS ON:	5,840	8,760
CLG HRS SAVED:	1,120	
HTG HRS SAVED:	1,792	1
C/H HRS SAVED:	2,920	1

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 09-Dec-95

PREPARED BY: AJN/DEJ

BLDG: 0211

BUILDING NAME: ADMIN

**ENERGY CALCULATION SUMMARY** 

System Type:

System Name: Small steam boiler

System Number: BLR-2

FUNCTION	kW/yr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.0
TOTAL	0.00	0.00	0.00 4.0

UMCS FUNCTI NO.		DO	ND COST AO POINTS	SUMMA DI POINTS	RY AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TOTAL:	1	0	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

DATE: 16-Sep-95
PREPARED BY: AJN/DEJ

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0211	BUILDING NAME: ADMIN

Building UA: 7,180 CONDITIONED SQFT: 41,062

### SYTEM INFORMATION ....

System Type: 27
System Name: Perimeter radiation valve
System Number: RAD-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks of	Winter: 3	2		
Weeks of S	ummer: 2	<u></u>		

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7.	7	7	7	7	7	7
REQ STOP:	23	23	23	23	23	23	23

INPUTS	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	45%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,240	3,360
HTG HRS ON:	3,584	5,376
H/C HRS ON:	5,840	8,760
CLG HRS SAVED:	1,120	· L
HTG HRS SAVED:	1,792	<del>-</del>
C/H HRS SAVED:	2,920	1

CONSTANTS	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	. 0
COAUC:	0
HOAOHC:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

BLDG: 0211

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 **DATE**: 16-Sep-95

PREPARED BY: AJN/DEJ

LOCATION: FT. RILEY, KS

BUILDING NAME: ADMIN

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	101	Viz 62 (20)		IMARY
F	· 经税 翻译 4 节 倍			

System Type: System Name: Perimeter radiation valve System Number: RAD-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.00	0.00	0.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMM/	\RY	
UMCS FUNCTI		DO	AO	DI	ΑĪ	COST
NO.	The state of the s	POINTS	POINTS	POINTS	POINTS	387
25	Optimum start/stop - Perimeter Rad Valve; Night setback - Perimeter	0	1	0	1	\$456.00
	Rad Valve					
	TOTAL:	n		0	4	\$456.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0211	BUILDING NAME	: ADMIN	
	Building UA:	7,180	CONDITIONED SQFT:	41,062

# SYTEM INFORMATION

System Type: 27

System Name: Perimeter radiation valve

System Number: RAD-1

atagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

200	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	7	7	7	7	7	7	7
REQ STOP:	23	23	23	23	23	23	23

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	45%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	2,240	3,360
HTG HRS ON:	3,584	5,376
H/C HRS ON:	5,840	8,760
CLG HRS SAVED:	1,120	7
HTG HRS SAVED:	1,792	T N
C/H HRS SAVED:	2,920	, ),

<u>CONSTANTS</u>	ì
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

PREPARED BY: AJN/DEJ

BLDG: 0211 BUILDING NAME: ADMIN

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ENER		A 100 CO			38.3833			
THE STATE OF THE S		4000 double - 10	6 NOW AND 25 ES	\$ 100007 L 10005 BH B	200 1 7 300		STATE OF THE STATE	
	100000	COMPANY OF THE PARK OF THE PAR	2000 (2000) (000)	2 75 CM P P P P P P P P P P P P P P P P P P	CONT. 1 S. SECTION.		F 1 F F F T T T T T T T T T T T T T T T	

System Type: 27
System Name: Perimeter radiation valve
System Number: RAD-1

kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
	1	3.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         .00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS FUNCTN NO:	TYPICAL SYSTEM UMCS APPLICATION	POINT A  DO  POINTS	AO	DI	AI POINTS	COST
25	Optimum start/stop - Perimeter Rad Valve; Night setback - Perimeter Rad Valve	0	1	0	1	\$456.00
	TOTAL:	0	1	0	1	\$456.00

# BUILDING 214 ENLISTED BARRACKS W/AS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0214 BUILDING NAME: ENL BAF	ARRACKS W/AS
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BLUG: UZ14	DUI	LDING NAME:	EINE DAKKACKO WIAO
	~ ^ ^ ~		CONDITIONIED COST

35,821 Building UA: 6,005 CONDITIONED SQFT:

### SYTEM INFORMATION

System Type: 10 System Name: Multizone air handling unit System Number: AHU-1

TYPICAL BUILDING INFORMATION						
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:		
	SANDSTONE BLOCK	BARRACKS	0000-2400	M-F: SAT-SUN		

Weeks of Winter: 32 Weeks of Summer: 20

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	10,120
CFM-CLG:	10,120
%OA:	15%
%Area:	31%
CHILLER CAP (TONS):	0;
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	:

•	<u>CONSTANTS</u>
0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
8.06	HOAOHC:
13	HOAOH:
0.000274	COAOHC:
0.000725	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000267	ECC:
0.000101	ECHC:
0	NSUCHC:
0	NSUCC:
0.0000895	DDCCHC:
0.000237	DDCCC:
18900	NSC:
37600	DDCH:
0	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS

BLDG: 0214 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

FUNCTION .	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	7.46	0.00	0.00
Night Setback	0.00	0.00	35.18
Sub Total	7.46	0.00	35.18
Economizer	0.00	8,953.77	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	7,934.28	69.99
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:	5.0

	TYPICAL SYSTEM	POINT AND COST SUMMARY					
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST	
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00	
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00	
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00	
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00	
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00	
	TOTAL:	1	8	1	11	\$4,509.00	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0214	<b>BUILDING NAME:</b>	ENL BARRACKS W/AS
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Building UA: 6,005 CONDITIONED SQFT: 35,821

#### SYTEM INFORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-2

### TYPICAL BUILDING INFORMATION

 Catagory Number:
 Construction:
 Use:
 Occupancy HRS:
 Occupancy Days:

 6 SANDSTONE BLOCK
 BARRACKS
 0000-2400
 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	. 0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

# <u>INPUTS</u>

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	10,039
CFM-CLG:	10,039
%OA:	15%
%Area:	31%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	<del>-</del> !
C/H HRS SAVED:	0	- !

### CONSTANTS

0	HOAUHC:
. 0	HOAUH:
0	COAUHC:
0	COAUC:
8.06	HOAOHC:
13	НОАОН:
0.000274	COAOHC:
0.000725	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000267	ECC:
0.000101	ECHC:
0	NSUCHC:
0	NSUCC:
0.0000895	DDCCHC:
0.000237	DDCCC:
18900	NSC:
37600	DDCH:
0	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS

BLDG: 0214 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 10
System Name: Multizone air handling unit

System Number: AHU-2

FUNCTION 1	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/y	Œ
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	35.18	
Sub Total	7.46	0.00	35.18	
Economizer	0.00	8,882.11	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	7,870.78	69.99	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.0
TOTAL	7.46	16,752.88	105.18	• 5.0

	TYPICAL SYSTEM	POINT A	(ND COS	T SUMMA	(RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	8	1	11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

35,821

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

### **ENERGY CALCULATION PARAMETERS**

**BLDG: 0214 BUILDING NAME:** ENL BARRACKS W/AS

Building UA: 6,005 CONDITIONED SQFT:

SYTEM INFORMATION ...

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

# TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
6	SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	1,100
CFM-CLG:	1,100
%OA:	10%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS PRESENT REQUIRED HR/YR HR/YR **CLG HRS ON:** 3,360 3,360 5,376 HTG HRS ON: 5,376 H/C HRS ON: 8,760 8,760 0 CLG HRS SAVED: 0 HTG HRS SAVED: 0 C/H HRS SAVED:

<u>ONSTANTS</u>	
HOAUHC:	
HOAUH:	
COAUHC:	
COAUC:	
HOAOHC:	8.0
HOAOH:	1
COAOHC:	0.00027
COAOC:	0.00072
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00026
ECHC:	0.00010
NSUCHC:	
NSUCC:	
DDCCHC:	0.000089
DDCCC:	0.00023
NSC:	1890
DDCH:	3760
OPT:	
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/AMS

BLDG: 0214

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

FUNCTION-	<u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	4.54	
Sub Total	1.76	0.00	4.54	
Economizer	0.00	973.24	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	862.42	9.03	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	:			3.00
TOTAL	1.76	1,835.66	13.57	3.00

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	NRY :	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	O	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL	1	3	-0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0214 BUILDING NAME: ENL BARRACKS W/AS

Building UA: 6,005 CONDITION

CONDITIONED SQFT:

35,821

### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN

SYSTEM OPERATING SCHEDULE

Weeks of Summer:

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	2,400
%QA:	10%
%Area:	9%
CHILLER CAP (TONS):	0:
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		PRESENT
	HR/YR	HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	-
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	•

<u>CONSTANTS</u>	4
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

BLDG: 0214 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-4

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	and the second s
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	10.21	
Sub Total	1.76	0.00	10.21	
Economizer	0.00	2,123.42	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,881.65	20.32	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	:			3.00
TOTAL	1.76	4,005.07	30.54	3.00

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0214	BUILDING NAME:	ENL BARRACKS W/AS

Building UA: 6,005 CONDITIONED SQFT: 35,821

#### SYTEMINEORMATION ...

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-5

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 6 SANDSTONE BLOCK BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,800
CFM-CLG:	2,800
%OA:	15%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	. 0	- }:
HTG HRS SAVED:	0	,
C/H HRS SAVED:	0	j.

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 0214 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit

System Number: AHU-5

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.76	0.00	0.00
Night Setback	0.00	0.00	11.35
Sub Total	1.76	0.00	11.35
Economizer	0.00	2,477.33	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	2,195.26	22.58
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		i	3.0
TOTAL	1.76	4,672.58	33.93

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

35,821

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE:** 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

DI DC.	0044	DITTI DINO MANE.	THE DADDACKC MAKE
BLDG:	UZ14	DUILDING NAME.	ENL BARRACKS W/AS

**Building UA:** CONDITIONED SQFT: 6,005

SYTEM INFORMATION .....

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
i	SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter: 32 Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0,	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>NPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	948,000
BLR CAP OUTPUT (BTUH):	758,400

### 

l .	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0.
OAR:	5.67

System Number:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

BLR-1

EMC NO: 1406-001

**DATE**: 09-Dec-95

PREPARED BY: AJN/AMS

BLDG: 0214

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 3

System Name: Small steam boiler

FUNCTION	kW/yr k	<u>Wh/yr</u> j	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.00

		TYPICAL SY	STEM POINT AN	ID COST	SUMMA	RY	
UMCS FUNCTI		S APPLICATION	DO	AO	DI	ΑĪ	COST
NO.	Unic	ATTLICATION				POINTS	
7	Ctoom Poilo	Monitoring	1	n	3	1	\$1.015.00
7	Steam boller	Wichitoring	•	U	J		Ψ1,010.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001

DATE: 09-Dec-95
PREPARED BY: AJN/AMS

### **ENERGY CALCULATION PARAMETERS**

**BLDG: 0214 BUILDING NAME:** ENL BARRACKS W/AS

Building UA: 6,005 CONDITIONED SQFT: 35,821

SYTEM INFORMATION

System Type: 3
System Name: Small steam boiler
System Number: BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:

6|SANDSTONE BLOCK BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32

SYSTEM OPERATING SCHEDULE

Weeks of Summer:

MON: SUN: TUE: THUR: FRI: SAT: PRES START: 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 **REQ START:** 0 0 0 0 0 0 0 **REQ STOP:** 24 24 24 24 24 24 24

20

<u>NPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	948,000
BLR CAP OUTPUT (BTUH):	758,400

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	1
HTG HRS SAVED:	0	i i
C/H HRS SAVED:	0	į

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

BUILDING NAME: ENL BARRACKS W/AS BLDG: 0214

ENERGY CALCULATION SUMMARY

System Type: System Name: Small steam boiler

System Number: BLR-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			:	4.00
TOTAL	<b></b>	0.00	0.00	4.00

UMCS FUNCTN NO.			ΑO	DI	RY AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	<b>101</b>	AL: 1	0	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

**ENERGY CALCULATION PARAMETERS** 

BLDG:	0214	BUILDING NAME: ENL BARRACKS W/A	١S

Building UA: 6,005 CONDITIONED SQFT: 35,821

### SYTEM INFORMATION

System Type: 7

System Name: Large air cooled chiller

System Number: CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:		0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>inputs</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	. 0%
CHILLER CAP (TONS):	70
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR		
CLG HRS ON:	3,360	3,360		
HTG HRS ON:	5,376	5,376		
H/C HRS ON:	8,760	8,760		
CLG HRS SAVED:	0	-  -  -		
HTG HRS SAVED:	0	1		
C/H HRS SAVED:	·	- ).		

<u>NSTANTS</u>	
HOAUHC:	(
HOAUH:	
COAUHC:	(
COAUC:	(
HOAOHC:	8.06
нолон:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	C
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	C
CHWR:	17.5
CNWR:	C
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 0214 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 7
System Name: Large air cooled chiller

System Number: CH-1

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.73	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	1.73	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	1,225.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	58.91	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:	6.00
TOTAL	60.64	1,225.00	0.00 8.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
12	Chilled water reset - Large Air Cooled Chiller	0	0	0	4	\$1,133.00
16	Alarms - Chiller	0	0	2	0	\$281.00
43	Chiller demand limiting - Large Air Cooled Chiller	5	0	0	0	\$530.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0214	BUILDING NAME:	ENL BARRACKS W/AS	
	Building UA:	6,005	CONDITIONED SQFT:	35,821

### SYTEM INFORMATION

System Type: 27

System Name: Perimeter radiation valve

System Number: RAD-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter: 32	2		

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	. 24
REQ START:	0	. 0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

### INPUTS Motor HP: 0.00 **HP Effic:** 0.00 Load Factor: 0.80 CFM-HTG: 0 CFM-CLG: 0 %OA: 0% %Area: 15% CHILLER CAP (TONS): 0 KW-TON: 0.00 BLR CAP INPUT (BTUH): 0 **BLR CAP OUTPUT (BTUH):** 0

# REQUIRED HR/YR PRESENT HR/YR CLG HRS ON: 3,360 3,360 HTG HRS ON: 5,376 5,376 H/C HRS ON: 8,760 8,760 CLG HRS SAVED: 0 HTG HRS SAVED: 0

0

HOURS CALCULATIONS

C/H HRS SAVED:

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
нолон:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/AMS

BLDG: 0214	BUILDING NAME:	ENL BARRACKS W/AS
ENER	CVCALCIIIAT	ION CHIMMADY
L CNER	GI CALCULAI	

System Type: 27
System Name: Perimeter radiation valve
System Number: RAD-1

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			;	3.0

UMCS FUNCIN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO	T SUMMA DI POINTS	AI POINTS	COST
25	Optimum start/stop - Perimeter Rad Valve; Night setback - Perimeter Rad Valve	0	1	0	1	\$456.00
	TOTAL:	0	1	0	1	\$456.00

### BUILDING 222 ADMINISTRATION GENERAL PURPOSE

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0222	BUILDING NAME:	ADMIN GEN PURP	
	Building UA:	3,297	CONDITIONED SQFT:	18,854

### SYTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLC	CK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

20 30 CO 30	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	11	7	7	7	7.	7	10
REQ STOP:	17	17	20	20	20	20	19

INPUTS	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	9,800
CFM-CLG:	9,800
%OA:	10%
%Area:	60%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,540	3,360
HTG HRS ON:	2,464	5,376
H/C HRS ON:	4,015	8,760
CLG HRS SAVED:	1,820	ì
HTG HRS SAVED	2,912	
C/H HRS SAVED:	4,745	i.

•	CONSTANTS
27.8	HOAUHC:
44.6	HOAUH:
. 0	COAUHC:
0	COAUC:
40.4	HOAOHC:
65	нолон:
0.000877	COAOHC:
0.00232	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0000629	ECC:
0.0000238	ECHC:
0.000609	NSUCHC:
0.00161	NSUCC:
0.000411	DDCCHC:
0.00109	DDCCC:
131000	NSC:
43100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ

BLDG:	0222	BUILDING NAME:	ADMIN GEN PURP
			anno ar anno anterior de la companio anterior de la companio de la companio de la companio de la companio de l

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	17,351.81	129.27	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	28,319.11	259.14	
Sub Total	7.46	46,786.27	388.42	
Economizer	0.00	936.46	0.00	
Ventilation/Recirculation	0.00	0.00	8.31	
DDC Control	0.00	16,171.62	85.26	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			:	3.00
TOTAL	7.46	63,894.34	481.99	3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ

### **ENERGY CALCULATION PARAMETERS**

BLDG: 0222 BUILDING NAME: ADMIN G
-----------------------------------

**Building UA:** 3,297 CONDITIONED SQFT: 18,854

### SYTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: **4 SANDSTONE BLOCK** ADMINISTRATION 0700-1700 M-F

Weeks of Winter: 32 Weeks of Summer: 20

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	11	7	7	7	7	7	10
REQ STOP:	17	17.	20	20	20	20	19

INPUTS	
Motor HP:	0.29
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	434,000
BLR CAP OUTPUT (BTUH):	350,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,540	3,360
HTG HRS ON:	2,464	5,376
H/C HRS ON:	4,015	8,760
CLG HRS SAVED:	1,820	
HTG HRS SAVED:	2,912	
C/H HRS SAVED:	4,745	

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ

BLDG: 0222 BUILDING NAME: ADMIN GEN PURP

**ENERGY CALCULATION SUMMARY** 

System Type: 1
System Name: Small hot water boiler

System Number: BLR-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>	
Schedule ST/SP	0.00	787.48	0.00	Altronomics and a second secon
Opt ST/SP	0.00	82.48	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	869.96	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.46	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			:	4.0
TOTAL	0.00	869.96	2.46 +	4.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	O	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95

PREPARED BY: AJN/DEJ

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0222	BUILDING NAME:	ADMIN GEN PURP	
	Building UA:	3,297	CONDITIONED SQFT:	18.854

### SYTEM INFORMATION 1 System Type: 6

System Name: Small air cooled chiller System Number: CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks of	Winter: 3	2		
Weeks of S	Summer: 2	0		

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	11	7	7	7	7	7	10
REQ STOP:	17	17	20	20	20	20	19

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,540	3,360
HTG HRS ON:	2,464	5,376
H/C HRS ON:	4,015	8,760
CLG HRS SAVED:	1,820	!
HTG HRS SAVED:	2,912	<u>.</u>
C/H HRS SAVED:	4,745	-

<u>CONSTANTS</u>	•
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 16-Sep-95
PREPARED BY: AJN/DEJ

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

BUILDING NAME: ADMIN GEN PURP

### ENERGY CALCULATION SUMMARY

System Type: 6
System Name: Small air cooled chiller

System Number: CH-1

BLDG: 0222

0.00 0.00 0.00 1.73	4,124.72 691.23 0.00 0.00	0.00 0.00 0.00
0.00 1.73	0.00	0.00
1.73		
	0.00	
0.00		0.00
0.00	0.00	0.00
1.73	4,815.95	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	525.00	0.00
0.00	0.00	0.00
25.25	0.00	0.00
1		4.0
TOTAL CONTROL OF THE PARTY OF T	0.00 0.00 0.00 0.00 0.00 0.00	0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     525.00       0.00     0.00       25.25     0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	O	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 **DATE:** 16-Sep-95

PREPARED BY: AJN/DEJ

LOCATION: FT. RILEY, KS

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0222	BUILDING NA	ME:	ADMIN GEN PURP	
	Building UA:	3,297		CONDITIONED SQFT:	18,854

SYTEMINEC	RMATION:
S	ystem Type: 25
Sy	stem Name: Hot water radiation pump
Syst	em Number: RAD-1

Catagory Number: C	Construction:	Use:	Occupancy HRS:	Occupancy Days
	SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks of W				

22000	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	11	7	7.	7	7.	7	10
REQ STOP:	17	17	20	20	20	20	19

Motor HP:	0.08
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,540	3,360
HTG HRS ON:	2,464	5,376
H/C HRS ON:	4,015	8,760
CLG HRS SAVED:	1,820	į
HTG HRS SAVED:	2,912	1
C/H HRS SAVED:	4,745	1

	CONSTANTS
27.8	HOAUHC:
44.6	HOAUH:
0	COAUHC:
0	COAUC:
40.4	HOAOHC:
65	нолон:
0.000877	COAOHC:
0.00232	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0000629	ECC:
0.0000238	ECHC:
0.000609	NSUCHC:
0.00161	NSUCC:
0.000411	DDCCHC:
0.00109	DDCCC:
131000	NSC:
43100	DDCH:
305	OPT:
17.5	CHWR:
(	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE:** 16-Sep-95 PREPARED BY: AJN/DEJ

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

BLDG: 0222	BUILDING NAME:	ADMIN GEN PURP
in the second second the second	IERGY CALCULAT	ION SUMMARY

25 System Type: Hot water radiation pump System Name:

RAD-1 System Number:

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	217.24	0.00
Opt ST/SP	0.00	22.75	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	239.99	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring,			3.00
Maintenance, Run Time, and Safety Alarms	:	:	
TOTAL	0.00	239.99	0.00 3.00

UMCS	TYPICAL SYSTEN	I POINT A	ND COS	T SUMMA	\RY	
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00

### BUILDING 223 ENLISTED BARRACKS W/DAS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95 PREPARED BY: AJN/AMS

### **ENERGY CALCULATION PARAMETERS**

BL	-DG: 0223	BUILDING NAM	<b>VIE:</b> ENL BARRACKS W/DAS	
	Building UA:	7,623	CONDITIONED SQFT:	47,794

### SYTEM INFORMATION

System Type:	10
System Name:	Multizone air handling unit
System Number	AHIL1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLC	CK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0.	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	7,450
CFM-CLG:	7,450
%OA:	15%
%Area:	28%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 3,360 3,360 HTG HRS ON: 5,376 5,376 H/C HRS ON: 8,760 8,760 **CLG HRS SAVED:** 0 HTG HRS SAVED: 0 0 C/H HRS SAVED:

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	
OAR:	5.67
OAN.	3.07

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS

BLDG: 0223 BUILDING NAME: ENL BARRACKS W/DAS

ENERGY CALCULATION SUMMARY

System Type: 10
System Name: Multizone air handling unit

System Number: AHU-1

FUNCTION .	kW/vr	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	0.00	40.34	
Sub Total	10.99	0.00	40.34	
Economizer	0.00	6,591.46	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	5,840.95	80.25	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			120.60	5

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	IRY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	8	1	11	\$4,509.00

PROJECT NAME: ÉEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001 **DATE:** 16-Sep-95

47,794

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

### PREPARED BY: AJN/AMS

### **ENERGY CALCULATION PARAMETERS**

BLDG: 0223 **BUILDING NAME: ENL BARRACKS W/DAS** 

**Building UA:** 7,623 CONDITIONED SQFT:

SYTEM INFORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-2

EYPICAL BUILD!	NG INFORMATION			
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
6	SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter: 32 Weeks of Summer: 20

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0.	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	7.50
MOTOR HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	7,150
CFM-CLG:	7,150
%OA:	15%
%Area:	27%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:		- !
HTG HRS SAVED:	0	- 
C/H HRS SAVED:	0	- 1

CONSTANTS	•
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: AJN/AMS

BLDG: 0223 BUILDING NAME: ENL BARRACKS W/DAS

**ENERGY CALCULATION SUMMARY** 

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-2

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	10.99	0.00	0.00
Night Setback	0.00	0.00	38.90
Sub Total	10.99	0.00	38.90
Economizer	0.00	6,326.03	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	5,605.74	77.39
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:	5.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

### **ENERGY CALCULATION PARAMETERS**

BLDG: 0223 BUILDING NAME: ENL BARRACKS W/DAS

Building UA: 7,623

CONDITIONED SQFT:

47,794

SYTEM INFORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-3

TYPICAL BUILD	<u>ING INFORMATION</u>			
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>inputs</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,000
CFM-CLG:	5,000
%OA:	20%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	<u>LCULAT</u>	

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	ì ,
HTG HRS SAVED	0	
C/H HRS SAVED:	0	•

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0,
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
нолон:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

BLDG: 0223 BUILDING NAME: ENL BARRACKS W/DAS

ENERGY CALCULATION SUMMARY

System Type: 10
System Name: Multizone air handling unit

System Number: AHU-3

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
0.00	.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
7.46	0.00	0.00	
0.00	0.00	20.17	
7.46	0.00	20.17	
0.00	4,423.80	0.00	
0.00	0.00	0.00	
0.00	3,920.10	40.13	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
	!		5.0
	0.00 0.00 7.46 0.00 7.46 0.00 0.00 0.00 0.00 0.00 0.00	0.00         .00,           0.00         0.00           0.00         0.00           7.46         0.00           0.00         0.00           7.46         0.00           0.00         4,423.80           0.00         0.00           0.00         3,920.10           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         .00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           7.46         0.00         0.00           0.00         0.00         20.17           7.46         0.00         20.17           0.00         4,423.80         0.00           0.00         0.00         0.00           0.00         3,920.10         40.13           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

	TYPICAL SYSTEM POINT AND COST SUMMARY						
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST	
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00	
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00	
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00	
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00	
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00	
	TOTAL:	1	8	1	11	\$4,509.00	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

### **ENERGY CALCULATION PARAMETERS**

Building UA: 7,623 CONDITIONED SQFT: 47,794

### SYTEM INFORMATION

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-4

# YPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 6 SANDSTONE BLOCK BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

\$5000 con \$6000	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>NPUTS</u>	
Motor HP:	5.00
HP Effic:	0,82
Load Factor:	0.80
CFM-HTG:	4,000
CFM-CLG:	4,000
%OA:	15%
%Area:	11%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	: (	)
HTG HRS SAVED:	. (	$\tilde{0}$
C/H HRS SAVED:	(	D

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95
PREPARED BY: AJN/AMS

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

BLDG: 0223 BUILDING NAME: ENL BARRACKS W/DAS

ENERGY CALCULATION SUMMARY

System Type: 10
System Name: Multizone air handling unit

System Number: AHU-4

<u>FUNCTION</u>	<u>kWlyr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	TO CONTRACT THE PART OF THE PA
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	15.85	
Sub Total	7.46	0.00	15.85	
Economizer	0.00	3,539.04	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	3,136.08	31.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:		5.04
- TOTAL	7.46	6,675.12	47.38	* 5.00

	TYPICAL SYSTEM POINT AND COST SUMMARY						
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AÎ POINTS	COST	
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00	
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00	
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00	
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00	
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00	
	TOTAL:	1	8	1	11	\$4,509.00	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 09-Dec-95

47,794

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

### **ENERGY CALCULATION PARAMETERS**

BLDG: 0223 BUILDING NAME: ENL BARRACKS W/DAS

Building UA: 7,623 CONDITIONED SQFT:

SYTEM INFORMATION :

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

6	SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
TYPICAL BUILDI	<u>NG INFORMATION</u>			

Weeks of Winter: 32
Weeks of Summer: 20

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>NPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,232,000
BLR CAP OUTPUT (BTUH):	1,860,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	]
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 09-Dec-95

PREPARED BY: AJN/AMS

0223 BUILDING NAME: ENL BARRACKS W/DAS

**ENERGY CALCULATION SUMMARY** 

System Type: 3

BLDG:

System Name: Small steam boiler

System Number: BLR-1

<b>FUNCTION</b>	<u>kWiyr</u> J	kWh/yr	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.0
TOTAL	0.00	0.00	0.00	4.0

	TYPICAL SYST	EM POINT AN	ND COST	SUMMA	RY	
UMCS				DI		COST
FUNCT NO.	N UMCS APPLICATION	DO POINTS	AO POINTS	POINTS	AI POINTS	
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TOTA				4	\$1.015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

47,794

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

### **ENERGY CALCULATION PARAMETERS**

BLDG: 0223 BUILDING NAME: ENL BARRACKS W
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Building UA: 7,623 CONDITIONED SQFT:

### SYTEMINFORMATION

System Type: 7
System Name: Large air cooled chiller
System Number: CH-1

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 6 SANDSTONE BLOCK BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

	RANGE (SEEDLESS) LISTER AND LISTER
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	70
KW-TON:	1.10
BLR CAP INPUT (BTUH):	Ō
BLR CAP OUTPUT (BTUH):	0

### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 3,360 3,360 HTG HRS ON: 5,376 5,376 H/C HRS ON: 8,760 8,760 CLG HRS SAVED: 0 0 HTG HRS SAVED: C/H HRS SAVED: 0

HOAUHC:	
HOAUH:	
COAUHC:	
COAUC:	
HOAOHC:	8.0
нолон:	
COAOHC:	0.00027
COAOC:	0.00072
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00026
ECHC:	0.00010
NSUCHC:	
NSUCC:	
DDCCHC:	0.000089
DDCCC:	0.00023
NSC:	1890
DDCH:	3760
OPT:	
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS

BLDG: 0223 BUILDING NAME: ENL BARRACKS W/DAS

ENERGY CALCULATION SUMMARY

System Type: 7
System Name: Large air cooled chiller
System Number: CH-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.66	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.66	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	1,225.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	58.91	0.00	0.00
Remote Monitoring,			6.0
Maintenance, Run Time, and Safety Alarms			0.00 6.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	O	1	0	\$386.00
12	Chilled water reset - Large Air Cooled Chiller	0	0	0	4	\$1,133.00
16	Alarms - Chiller	0	0	2	0	\$281.00
43	Chiller demand limiting - Large Air Cooled Chiller	5	0	0	0	\$530.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS

### **ENERGY CALCULATION PARAMETERS**

BLDG: 0223 BUILDING NAME: ENL B	BARRACKS W/DAS
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CONDITIONED SQFT: **Building UA:** 7,623

47,794

### SYTEM INFORMATION

System Type: 27

System Name: Perimeter radiation valve

System Number: RAD-1

### TYPICAL BUILDING INFORMATION Occupancy Days: Catagory Number: Construction: Use: Occupancy HRS: M-F; SAT-SUN 6 SANDSTONE BLOCK BARRACKS 0000-2400

Weeks of Winter: 32 Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%QA:	0%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

### HOURS CALCULATIONS

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	C	- 
HTG HRS SAVED:	C	Ī
C/H HRS SAVED:	C	ī

	<u>NSTANTS</u>
	HOAUHC:
	HOAUH:
	COAUHC:
	COAUC:
8.0	HOAOHC:
1	НОАОН:
0.00027	COAOHC:
0.00072	COAOC:
0.1	DC DUTY:
0.1	DC DEMAND:
0.00026	ECC:
0.00010	ECHC:
	NSUCHC:
	NSUCC:
0.000089	DDCCHC:
0.00023	DDCCC:
1890	NSC:
3760	DDCH:
	OPT:
17	CHWR:
	CNWR:
5.6	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: AJN/AMS

**DATE:** 16-Sep-95

BLDG: 0223 BUILDING NAME: ENL BARRACKS W/DAS

ENERGY CALCULATION SUMMARY

System Type: 27
System Name: Perimeter radiation valve
System Number: RAD-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			:	3.00
TOTAL	0.00	0.00	0.00	3.00

TUMCS FUNCTN NO.  DO AO DI AI POINTS POINTS POINTS POINTS  25 Optimum start/stop - Perimeter Rad  0 1 0 1	COST
Valve; Night setback - Perimeter	\$456.00
Rad Vaive	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

### PREPARED BY: AJN/AMS

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0223	BUILDING NAME:	ENL BARRACKS W/DAS
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Building UA: 7,623 COI

CONDITIONED SQFT:

47,794

### SYTEM INFORMATION

System Type: 21

System Name: HW Unit heater

System Number: UH-1

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 6 SANDSTONE BLOCK BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	4,200
CFM-CLG:	0
%OA:	0%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	Ō

### REQUIRED PRESENT HR/YR HR/YR 3,360 **CLG HRS ON:** 3,360 5,376 HTG HRS ON: 5,376 8,760 8,760 H/C HRS ON: 0 CLG HRS SAVED: HTG HRS SAVED: 0

0

HOURS CALCULATIONS

C/H HRS SAVED:

CONSTANTS	
HOAUHC:	0
HOAUH:	, 0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

BLDG: 0223

BUILDING NAME: ENL BARRACKS W/DAS

### ENERGY CALCULATION SUMMARY

System Type:

System Name: HW Unit heater

UH-1 System Number:

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	8.64	
Sub Total	0.00	0.00	8.64	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	0.00	8.64	↑ 0.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:		0		2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 **DATE**: 16-Sep-95

47,794

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0223	BUILDING NAME:	ENL BARRACKS W/DAS
DLDG.	VLLU		

CONDITIONED SQFT: **Building UA:** 7,623

### SYTEM INFORMATION ...

System Type: 21 System Name: HW Unit heater System Number: UH-2

TYPICAL BUILD	ING INFORMATION			
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN

32 Weeks of Winter: 20 Weeks of Summer:

2000-000000 900-000000000000000000000000	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	. 24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	4,800
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:		- ),
HTG HRS SAVED:	C	)
C/H HRS SAVED:	C	Ī.

HOAUHC:	
HOAUH:	
COAUHC:	
COAUC:	
HOAOHC:	8.0
нолон:	
COAOHC:	0.00027
COAOC:	0.00072
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00026
ECHC:	0.0001
NSUCHC:	
NSUCC:	
DDCCHC:	0.00008
DDCCC:	0.0002
NSC:	189
DDCH:	376
OPT:	
CHWR:	17
CNWR:	
OAR:	5.

0223

BLDG:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: AJN/AMS

**DATE:** 16-Sep-95

BUILDING NAME: ENL BARRACKS W/DAS

ENERGY CALCULATION SUMMARY

System Type: 21
System Name: HW Unit heater
System Number: UH-2

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u>	MH/yr
Schedule ST/SP	0.00	.00.	0.00	2000
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	11.53	
Sub Total	0.00	0.00	11.53	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				0.00
Maintenance, Run Time, and Safety Alarms	•	l .		
TOTAL	0.00	0.00	11.53	· 0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO	AO	T SUMMA  DI  POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

### BUILDING 227 ENLISTED BARRACKS W/AS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE: 16-Sep-95** LOCATION: FT. RILEY, KS PREPARED BY: AJN/CWW

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0227		<b>BUILDING NAME:</b>	ENL BARRACKS W/AS

**Building UA:** 5,152 CONDITIONED SQFT:

32,303

### SYTEM INFORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 6 SANDSTONE BLOCK BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32 Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	F 00
WIQLOT HP;	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	10,120
CFM-CLG:	10,120
%OA:	10%
%Area:	40%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	. 0	-
HTG HRS SAVED:	. 0	
C/H HRS SAVED:	0	•

<u>ONSTANTS</u>	
HOAUHC:	C
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 0227

BUILDING NAME: ENL BARRACKS W/AS

### ENERGY CALCULATION SUMMARY

10 System Type: System Name:

Multizone air handling unit

System Number: AHU-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	38.95	
Sub Total	7.46	0.00	38.95	
Economizer	0.00	8,953.77	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	7,934.28	77.49	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.0
TOTAL	7.46	16,888.05	116.44	\$.00

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	(RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	8	1	11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

EMC NO: 1406-001

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0227	BUILDING NAME:	ENL BARRACKS W/AS
	ULL!	DOILDING NAME.	LITE DAINIMONG WIAG

Building UA: 5,152 CONDITIONED SQFT: 32,303

### SYTEM INFORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-2

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 6 SANDSTONE BLOCK BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0.	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	10,039
CFM-CLG:	10,039
%OA:	10%
%Area:	40%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	- 
HTG HRS SAVED:	0	í
C/H HRS SAVED:	0	i.

CHAINIO	•
HOAUHC:	C
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
нолон:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 0227

BUILDING NAME: ENL BARRACKS W/AS

### ENERGY CALCULATION SUMMARY

10 System Type: System Name:

Multizone air handling unit

AHU-2 System Number:

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	38.95	
Sub Total	7.46	0.00	38.95	
Economizer	0.00	8,882.11	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	7,870.78	77.49	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.0
TOTAL	7.46	16,752.88	116.44	5.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

EMC NO: 1406-001

32,303

LOCATION: FT. RILEY, KS PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0227	BUILDING NAME:	ENL BARRACKS W/AS
	Building UA:	5,152	CONDITIONED SQFT:

# SYTEM INFORMATION

	Manager to Audio American de
System Type:	15
System Name:	Small Single Zone air handling ut

System Number: AHU-3

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	Winter: 32			

### SYSTEM OPERATING SCHEDULE

**************************************	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	1,100
CFM-CLG:	1,100
%OA:	10%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	. 0	
HTG HRS SAVED:	0	
C/H HRS SAVED	0	, ,

<u>ONSTANTS</u>	
HOAUHC:	C
HOAUH:	(
COAUHC:	
COAUC:	(
HOAOHC:	8.06
нолон:	13
COAOHC:	0.000274
COAOC:	0.00072
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00026
ECHC:	0.00010
NSUCHC:	
NSUCC:	
DDCCHC:	0.000089
DDCCC:	0.00023
NSC:	1890
DDCH:	3760
OPT:	
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BUILDING NAME: ENL BARRACKS W/AS BLDG: 0227

ENERGY CALCULATION SUMMARY

System Type:

Small Single Zone air handling unit System Name:

AHU-3 System Number:

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr	
0.00	.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
1.76	0.00	0.00	
0.00	0.00	3.89	
1.76	0.00	3.89	
0.00.	973.24	0.00	
0.00	0.00	0.00	
0.00	862.42	7.75	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
		,	3.0
	0.00 0.00 0.00 1.76 0.00 1.76 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00       .00         0.00       0.00         0.00       0.00         1.76       0.00         0.00       0.00         1.76       0.00         0.00       973.24         0.00       0.00         0.00       862.42         0.00       0.00         0.00       0.00         0.00       0.00         0.00       0.00         0.00       0.00         0.00       0.00         0.00       0.00         0.00       0.00	0.00         .00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           1.76         0.00         0.00           0.00         0.00         3.89           1.76         0.00         3.89           0.00         973.24         0.00           0.00         0.00         0.00           0.00         862.42         7.75           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0227	BUILDING NAME:	ENL BARRACKS W/AS	
	Building IIA:	5 152	CONDITIONED SQFT:	32,303

**Building UA:** 5,152 CONDITIONED SQFT:

SYTEM INFORMATION

System Type: 15 System Name: Small Single Zone air handling unit System Number: AHU-4

Catagory Number:	Construction:	Use:		Occupancy HRS:	Occupancy Days
	6 SANDSTONE BLOCK	BARR	ACKS	0000-2400	M-F; SAT-SUN
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0.	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	1,100
CFM-CLG:	1,100
%OA:	10%
%Area:	4%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	C

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	: 0	)
HTG HRS SAVED:	. 0	)
C/H HRS SAVED:	: C	<b>5</b>

<u>INSTANTS</u>	
HOAUHC:	(
HOAUH:	(
COAUHC:	
COAUC:	
нолонс:	8.0
ноаон:	1
COAOHC:	0.00027
COAOC:	0.00072
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00026
ECHC:	0.00010
NSUCHC:	
NSUCC:	
DDCCHC:	0.000089
DDCCC:	0.00023
NSC:	1890
DDCH:	3760
OPT:	
CHWR:	17
CNWR:	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 0227 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	.00'	0.00
0.00	0.00	0.00
0.00	0.00	0.00
1.76	0.00	0.00
0.00	0.00	3.89
1.76	0.00	3.89
0.00	973.24	0.00
0.00	0.00	0.00
0.00	862.42	7.75
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
	;	, 3.0
	0.00 0.00 0.00 1.76 0.00 1.76 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	0.00         .00'           0.00         0.00           0.00         0.00           1.76         0.00           0.00         0.00           1.76         0.00           0.00         973.24           0.00         0.00           0.00         862.42           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0227	BUILDING	NAME: ENL BARRACKS W/AS	;
	Building UA:	5,152	CONDITIONED SQFT:	32,303

SYTEM INFORMATION	
System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-5

		Occupancy HRS:	Occupancy Days:
6 SANDSTONE	BARRACKS	0000-2400	M-F; SAT-SUN

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: THUR: FRI: SAT: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 0 **REQ START:** 0 0 0 0 0 0 **REQ STOP:** 24 24 24 24 24 24 24

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,800
CFM-CLG:	2,800
%OA:	10%
%Area:	12%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	<u>-</u>    -
HTG HRS SAVED:	0	ī
C/H HRS SAVED:	. 0	

CONSTANTS	
HOAUHC:	C
HOAUH:	C
COAUHC:	C
COAUC:	
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	C
NSUCC:	C
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 0227 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

FUNCTION	<u>kWiyr</u>	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	11.68	
Sub Total	1.76	0.00	11.68	
Economizer	0.00	2,477.33	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,195.26	23.25	
HW OA Reset	0.00	0.00	0.00	,
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	4,672.58	34.93	3.00

	TYPICAL SYSTEM POINT AND COST SUMMARY					
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST -
	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 09-Dec-95

32,303

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0227	BUILDING NAME:	ENL BARRACKS W/AS
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**CONDITIONED SQFT: Building UA:** 5,152

SYTEM INFORMATION

System Type: 3 System Name: Small steam boiler System Number: BLR-1

#### TYPICAL BUILDING INFORMATION Occupancy HRS: Occupancy Days: Use: Construction: Catagory Number: BARRACKS 0000-2400 M-F; SAT-SUN 6 SANDSTONE BLOCK 32 Weeks of Winter: 20 Weeks of Summer:

The state of the s	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	. 0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>NPUTS</u>	4
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	948,000
BLR CAP OUTPUT (BTUH):	758,400

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	: 0	
C/H HRS SAVED:	. 0	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
нолон:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 09-Dec-95

D

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 0227 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

<u>FUNCTION</u>	kW/yr	kWb/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.0
TOTAL	0.00	0.00	0.00 4.0

		TYPICAL SY	STEM POINT	AND COS	T SUMMA	RY	
UMCS		APPLICATION	DO	AO	DΪ	ΑĪ	COST
NO.			POINTS			POINTS .	
7	Steam Boiler	Monitoring	1	0	3	1	\$1,015.00
		TO1	AL: 1	0	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

**DATE:** 09-Dec-95

32,303

#### **ENERGY CALCULATION PARAMETERS**

**BLDG**: 0227 **BUILDING NAME: ENL BARRACKS W/AS** 

**Building UA:** 5,152 CONDITIONED SQFT:

SYTEM INFORMATION

System Type: 3

System Name: Small steam boiler

System Number: BLR-2

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 6 SANDSTONE BLOCK BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32 Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

MON: THUR: SUN: TUE: WED: FRI: SAT: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 **REQ START:** 0 0 0 0 0 0 0 **REQ STOP:** 24 24 24 24 24 24 24

**INPUTS** Motor HP: 0.00 **HP Effic:** 0.00 Load Factor: 0.80 CFM-HTG: 0 CFM-CLG: 0 %OA: 0% %Area: 0% CHILLER CAP (TONS): 0 KW-TON: 0.00 **BLR CAP INPUT (BTUH):** 948,000 **BLR CAP OUTPUT (BTUH):** 758,400

HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 3,360 3.360 HTG HRS ON: 5,376 5,376 H/C HRS ON: 8,760 8,760 **CLG HRS SAVED:** 0 HTG HRS SAVED: 0 C/H HRS SAVED: 0

**CONSTANTS** HOAUHC: 0 HOAUH: 0 COAUHC: 0 COAUC: 0 HOAOHC: 8.06 HOAOH: 13 COAOHC: 0.000274 COAOC: 0.000725 DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0.000267 ECHC: 0.000101 **NSUCHC:** 0 **NSUCC:** 0 DDCCHC: 0.0000895 DDCCC: 0.000237 NSC: 18900 DDCH: 37600 OPT: 0 CHWR: 17.5 CNWR: 0 OAR: 5.67

BLDG: 0227

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO**: 1406-001 **DATE**: 09-Dec-95

PREPARED BY: AJN/CWW

LOCATION: FT. RILEY, KS

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 3
System Name: Small steam boiler

System Number: BLR-2

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.0
TOTAL	0.00	0.00	0.00

TYPICAL SYSTEM	POINT A	ND COST	SUMMA	RY	
UMCS					COST
FUNCTN UMCS APPLICATION NO.	POINTS	AO POINTS	DI POINTS	AI POINTS	LUSI
7 Steam Boiler Monitoring	1	0	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0227	BUII	LDING NAME:	ENL BARRACKS W/AS	
	Building UA:	5,152		CONDITIONED SQFT:	32,303

SYTEM INFORMATION	Market Street, and the second street, and the
System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	f Winter: 32	2		

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
RES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0,	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	65
KW-TON:	1.10.
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	. 0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	!

ONSTANTS	•
HOAUHC:	(
HOAUH:	(
COAUHC:	(
COAUC:	(
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	(
NSUCC:	(
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	(
CHWR:	17.5
CNWR:	(
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BLDG:	0227		ENL BARRACKS W/AS
	ENER	RGY CALCULAT	ION SUMMARY

System Type: 6
System Name: Small air cooled chiller
System Number: CH-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.73	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	1.73	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	1,137.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	54.70	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.0
TOTAL	56.43	1,137.50	0.00 , 4.0

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
	TOTAL:	2	0	3	2	\$1,481.00

## BUILDING 253 DRUG ABUSE CENTER

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0253	BUILDING NAME:	DRUG ABUSE CTR

Building UA: 2,414

CONDITIONED SQFT:

11,122

#### SYTEM INFORMATION ...

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 10 BRICK AND CMU DENTAL CLINIC 0800-1700 M-F Weeks of Winter: 32

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

200 m	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,350
CFM-CLG:	1,350
%OA:	15%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	0

## HOURS CALCULATIONS

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED	2,460	
HTG HRS SAVED	3,936	Ĩ
C/H HRS SAVED	6,414	

CONSTANTS	
HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.001
COAOC:	0.004
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00082
ECHC:	0.00031
NSUCHC:	0.00014
NSUCC:	0.00037
DDCCHC:	0.00011
DDCCC:	0.00031
NSC:	3600
DDCH:	4030
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AMS/AJN

BLDG: 0253 BUILDING NAME: DRUG ABUSE CTR

ENERGY CALCULATION SUMMARY

System Type: 15

System Name:

Small Single Zone air handling unit

FUNCTION .	kW/yr	kWh/yr	MBtu/yr MH/yr	
Schedule ST/SP	0.00	5,921.05	65.20	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.38	0.00	0.00	
Night Setback	0.00	1,238.14	8.69	
Sub Total	1.38	7,366.04	73.89	
Economizer	0.00	988.32	0.00	
Ventilation/Recirculation	0.00	74.73	3.10	
DDC Control	0.00	376.95	9.73	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	1.38	8,806.04	86.72	3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AMS/AJN

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0253	BUILDING NAME:	DRUG ABUSE CTR	
	Building UA:	2,414	CONDITIONED SQFT:	11,122

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	0 BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F
Weeks of	Winter:	32		
Weeks of S		20		

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	3,060
CFM-CLG:	3,060
%OA:	15%
%Area:	21%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR	
CLG HRS ON:	900	3,360	
HTG HRS ON:	1,440	5,376	
H/C HRS ON:	2,346	8,760	
CLG HRS SAVED:	2,460	?	
HTG HRS SAVED:	3,936	i i	
C/H HRS SAVED:	6,414	<del>-</del>	

CONSTANTS	
HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
НОАОН:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AMS/AJN

BLDG: 0253 BUILDING NAME: DRUG ABUSE CTR

ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
0.00	11,320.72	147.78	
0.00	368.97	0.00	
0.00	0.00	0.00	
2.47	0.00	0.00	
0.00	2,806.45	18.25	
2.47	14,496.14	166.03	
0.00	2,240.18	0.00	
0.00	169.39	7.03	
0.00	854.43	20.43	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.0
	0.00 0.00 2.47 0.00 2.47 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         11,320.72           0.00         368.97           0.00         0.00           2.47         0.00           0.00         2,806.45           2.47         14,496.14           0.00         2,240.18           0.00         169.39           0.00         854.43           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         11,320.72         147.78           0.00         368.97         0.00           0.00         0.00         0.00           2.47         0.00         0.00           0.00         2,806.45         18.25           2.47         14,496.14         166.03           0.00         2,240.18         0.00           0.00         169.39         7.03           0.00         854.43         20.43           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

MCS NCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AMS/AJN

## **ENERGY CALCULATION PARAMETERS**

BUILDING NAME: DRUG ABUSE CTR BLDG: 0253

11,122 CONDITIONED SQFT: **Building UA:** 

SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

Catagory Number:	ING INFORMATIO	Use:	Occupancy HRS:	Occupancy Days:
	0 BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F
Weeks of	Winter:	32		
Weeks of S	Summer:	20		

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>NPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,505
CFM-CLG:	2,505
%OA:	15%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
RI R CAP OUTPUT (BTUH):	0

но	URS	CA	LCU	LAT	IONS
237					

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED	2,460	<u>.</u> ),
HTG HRS SAVED	: 3,936	i
C/H HRS SAVED	6,414	Ī.

50.2	HOAUHC:
80.7	HOAUH:
0.00121	COAUHC:
0.0032	COAUC:
45.3	HOAOHC:
72.8	HOAOH:
0.0017	COAOHC:
0.0045	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000826	ECC:
0.000312	ECHC:
0.000143	NSUCHC:
0.000379	NSUCC:
0.000119	DDCCHC:
0.000316	DDCCC:
36000	NSC:
40300	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AMS/AJN

BLDG: 0253 BUILDING NAME: DRUG ABUSE CTR

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	8,447.22	120.98	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	2,297.44	13.90	
Sub Total	1.76	11,007.70	134.88	
Economizer	0.00	1,833.87	0.00	
Ventilation/Recirculation	0.00	138.67	5.75	
DDC Control	0.00	699.46	15.57	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				3.00
Maintenance, Run Time, and Safety Alarms	:			
TOTAL	1.76	13,679.70	156.20	· 3.00

UMCS- UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

**DATE:** 16-Sep-95

**ENERGY CALCULATION PARAMETERS** 

BLDG: 0253 BUILD	IG NAME: DRUG ABUSE CTR
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**Building UA:** 2,414 CONDITIONED SQFT:

11,122

SYTEM INFORMATION ....

System Name: Small Single Zone air handling unit

System Number: AHU-4

Catagory Number:	ING INFORMATION Construction:	Use:	Occupancy HRS:	Occupancy Days:
	OBRICK AND CMU	DENTAL CLINIC	0800-1700	M-F
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	. 7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	1,920
CFM-CLG:	1,920
%OA:	15%
%Агеа:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED	2,460	-
HTG HRS SAVED	3,936	•
C/H HRS SAVED:	6,414	

<u>INSTANTS</u>	
HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
нолон:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AMS/AJN

BUILDING NAME: DRUG ABUSE CTR BLDG: 0253 ENERGY CALCULATION SUMMARY

System Type: Small Single Zone air handling unit

AHU-4 System Number:

System Name:

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	7,766.24	92.72	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	1,760.91	11.30	
Sub Total	1.76	9,790.19	104.02	
Economizer	0.00	1,405.60	0.00	
/entilation/Recirculation	0.00	106.29	4.41	
DDC Control	0.00	536.11	12.65	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				3.0
Maintenance, Run Time,				
and Safety Alarms				3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0253 BUILDING NAM	E: DRUG ABUSE CTR	
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Building UA: 2,414 CONDITIONED SQFT: 11,122

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-5

***	ING INFORMATION		Ossumensu UDS:	O
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	0 BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F
Weeks of	Winter:	32		
Weeks of S	ummer.	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7.	7	7	7	0,
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,630
CFM-CLG:	2,630
%OA:	15%
%Area:	9%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### REQUIRED HR/YR PRESENT HR/YR CLG HRS ON: 900 3,360 5,376 HTG HRS ON: 1,440 H/C HRS ON: 2,346 8,760 CLG HRS SAVED: 2,460 HTG HRS SAVED: 3,936

6,414

HOURS CALCULATIONS

C/H HRS SAVED:

CONSTANTS	
HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
НОАОН:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95 PREPARED BY: JM/AMS/AJN LOCATION: FT. RILEY, KS

BUILDING NAME: DRUG ABUSE CTR BLDG: 0253 

ENERGY CALCULATION SUMMARY

EMC NO: 1406-001

System Type: 15

System Name: Small Single Zone air handling unit

AHU-5 System Number:

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	10,820.17	127.01	50
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	2,412.08	7.82	
Sub Total	2.47	13,601.22	134.84	
Economizer	0.00	1,925.39	0.00	
Ventilation/Recirculation	0.00	145.59	6.04	
DDC Control	0.00	734.36	8.76	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.47	16,406.56	149.63	* 3.00

Optii limiti	eduled start/stop control - AHU; mum start/stop - AHU; Demand ng - AHU; Duty Cycling - AHU;	1	0	0	1	\$348.00
Nigh	t setback - AHU					
27 Direc	et digital control - Small SZ AHU	0	2	0	3	\$1,097.00
	ide air damper ventilation and culation control - AHU	0	1	0	0	\$272.00
	ide air damper economizer ol - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0253 BUIL	DING NAME: DRUG ABUSE CTR
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**Building UA:** 2,414 CONDITIONED SQFT: 11,122

## SYTEM INFORMATION

System Type: 15 System Name: Small Single Zone air handling unit System Number: AHU-6

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 10 BRICK AND CMU DENTAL CLINIC 0800-1700 M-F Weeks of Winter: 32

Weeks of Summer: 20

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,705
CFM-CLG:	1,705
%OA:	15%
%Area:	21%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	- )
HTG HRS SAVED:	3,936	, •
C/H HRS SAVED:	6,414	-

CONSTANTS	*
HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AMS/AJN

BLDG: 0253 BUILDING NAME: DRUG ABUSE CTR
ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit

<u>FUNCTION</u>	<u>kWiyr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	6,334.30	82.34
Opt ST/SP	0.00	206.85	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.38	0.00	0.00
Night Setback	0.00	1,563.72	18.25
Sub Total	1.38	8,104.87	100.59
Economizer	0.00	1,248.21	0.00
Ventilation/Recirculation	0.00	94.38	3.92
DDC Control	0.00	476.08	20.43
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		!	3.0
TOTAL	1.38	9,923.53	124.94 . 3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	O	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AMS/AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0253	BUILDING NAME	: DRUG ABUSE CTR	
	Building UA:	2,414	CONDITIONED SQFT:	11,122

SYTEMINFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

Catagory Number: Construction: Use: Occupancy HRS:	
TOBRICK AND CING DENTAL CENTRO	
Weeks of Winter: 32	

-	SYSTEM OPERATING SCHEDU	JLE:	200000
		San San San San	

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,945
CFM-CLG:	2,945
%OA:	. 15%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	; i
C/H HRS SAVED:	6,414	

<u>CONSTANTS</u>	
HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
нолонс:	45.3
НОАОН:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	C
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: JM/AMS/AJN

BLDG: 0253 BUILDING NAME: DRUG ABUSE CTR

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	11,186.85	142.23	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	2,700.98	8.69	
Sub Total	2.47	14,256.80	150.92	
Economizer	0.00	2,155.99	0.00	
Ventilation/Recirculation	0.00	163.03	6.76	
DDC Control	0.00	822.32	9.73	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,		i		3.0
Maintenance, Run Time,				
and Safety Alarms			167.41	3

TYPICAL SYSTEM POINT AND COST SUMMARY							
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST	
	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00	
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00	
	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00	
	Outside air damper economizer control - AHU	0	0	0	2	\$399.00	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM/AMS/AJN

**ENERGY CALCULATION PARAMETERS** 

BLDG:	0253	BUILDING NAME:	DRUG ABUSE CTR	
	Building UA:	2,414	CONDITIONED SQFT:	11,122

## SYTEM INFORMATION ...

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	0 BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	. 0	0	0:	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>inputs</u>	
Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	963,000
BLR CAP OUTPUT (BTUH):	770,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	-  -
HTG HRS SAVED:	3,936	1
C/H HRS SAVED:	6,414	-

	CONSTANTS
50.2	HOAUHC:
80.7	HOAUH:
0.00121	COAUHC:
0.0032	COAUC:
45.3	HOAOHC:
72.8	нолон:
0.0017	COAOHC:
0.0045	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000826	ECC:
0.000312	ECHC:
0.000143	NSUCHC:
0.000379	NSUCC:
0.000119	DDCCHC:
0.000316	DDCCC:
36000	NSC:
40300	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AMS/AJN

BUILDING NAME: DRUG ABUSE CTR BLDG: 0253 

ENERGY CALCULATION SUMMARY

System Type: Small hot water boiler System Name: BLR-1 System Number:

FUNCTION	<u>kWbyr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	2,669.32	0.00
Opt ST/SP	0.00	206.85	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	2,876.17	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	5.46 <sup>-</sup>
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring,			4.0
Maintenance, Run Time, and Safety Alarms			
TOTAL	0.00	2,876.17	5.46 . 4.0

	TYPICAL SYSTEM	I POINT A	ND COS	T SUMM/	ARY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	O	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95 PREPARED BY: JM/AMS/AJN

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0253	BUILDING N	AME: DRUG ABUSE CTR	
	Building UA:	2,414	CONDITIONED SQFT:	11,122
SYTEM	INFORMATION			and a
	System Type: 6			

SYTEM INFORMATION	The second second second second
System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days
1(	BRICK AND CMU		DENTAL CLINIC	0800-1700	M-F
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7:	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	(
CFM-CLG:	(
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	32
KW-TON:	1.10
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	(

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	I
HTG HRS SAVED:	3,936	-
C/H HRS SAVED:	6,414	•

<u>CONSTANTS</u>	
HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
НОАОН:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

FILL ARLD DI. 0

PREPARED BY: JM/AMS/AJN

BLDG: 0253 BUILDING NAME: DRUG ABUSE CTR
ENERGY CALCULATION SUMMARY

System Type: 6
System Name: Small air cooled chiller

<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
0.00	1,668.33	0.00
0.00	206.85	0.00
0.00	0.00	0.00
0.52	0.00	0.00
0.00	0.00	0.00
0.52	1,875.17	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	560.00	0.00
0.00	0.00	0.00
26.93	0.00	0.00
		4.0
	0.00 0.00 0.00 0.52 0.00 0.52 0.00 0.00 0.00 0.00	0.00         1,668.33           0.00         206.85           0.00         0.00           0.52         0.00           0.52         1,875.17           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         560.00           0.00         0.00           0.00         0.00

	TYPICAL SYSTEM POINT AND COST SUMMARY							
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST		
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	O	1	0	\$386.00		
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00		
16	Alarms - Chiller	0	0	2	0	\$281.00		
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00		
	TOTAL:	2	0	3	2	\$1,481.00		

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AMS/AJN

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0253	BUILDING NAME: DRUG ABUSE CTR
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**Building UA:** 2,414

CONDITIONED SQFT:

11,122

#### SYSTEM IN EORMATION ...

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

 Construction:	Use:	Occupancy HRS:	Occupancy Days:
BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F
NG INFORMATION		1 1 1	

Weeks of Winter: 32 Weeks of Summer: 20

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
<b>REQ START:</b>	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	-
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	1

<u>CONSTANTS</u>	•
HOAUHC:	50.2
HOAUH:	- 80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
НОАОН:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AMS/AJN

BLDG: 0253 BUILDING NAME: DRUG ABUSE CTR

ENERGY CALCULATION SUMMARY

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

FUNCTION .	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	7,758.69	0.00
Opt ST/SP	0.00	368.97	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	2.47	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	2.47	8,127.66	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	2.47	8,127.66	0.90 3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	ND COS  AO POINTS	T SUMMA  DI POINTS	ARY  AI  POINTS	COST
	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW	1	0	1	4	\$1,418.00
	Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	•				
	TOTAL:	1	0		4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE:

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

EMC NO: 1406-001

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0253 BUILDING NAME: DRUG ABUSE CTR

Building UA: 2,414

CONDITIONED SQFT:

11,122

SYTEM INFORMATION

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
10	BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE .....

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>inputs</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	- : :
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	•

<u>CONSTANTS</u>	
HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

BLDG: 0253

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM/AMS/AJN

LOCATION: FT. RILEY, KS

BUILDING NAME: DRUG ABUSE CTR

ENERGY CALCULATION SUMMAR	
	398
	20.8
2000 1 mg 1 c mg 7 c の 比 850 m A 2 c mg m 2 c c i 25 c i 25 c m 2 c i 25 c i 25 c i 25 c i 27 c i 27 c i 27 c i	2.33

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-2

0.00	7,758.69	0.00	The second secon
0.00		0.00	
0.00	368.97	0.00	
0.00	0.00	0.00	
2.47	0.00	0.00	
0.00	0.00	0.00	
2.47	8,127.66	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.00
	2.47 0.00 2.47 0.00 0.00 0.00 0.00 0.00 0.00	2.47         0.00           0.00         0.00           2.47         8,127.66           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	2.47         0.00         0.00           0.00         0.00         0.00           2.47         8,127.66         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO	T SUMMA  DI POINTS	ARY AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	O	1	4	\$1,418.00
	TOTAL:	1	0	1	4	\$1,418.00

## BUILDING 301 FINANCE ADMINISTRATION

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

Commence of the second

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0301	BUILDING NAME:	FINANCE ADMIN	
	Building UA:	7,152	CONDITIONED SQFT:	32,947

#### SYTEM INFORMATION

System Type: 11

System Name: Variable Air Volume air handling unit

System Number: AHU-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE B	LOCK	ADMINISTRATION	0700-1700	M-F
Weeks of	Winter:	32			
Weeks of S	Summer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	7	7	7	7	7	8
REQ STOP:	12	16	16	16	16	16	12

Mata- UD:	1.50
Motor HP:	
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,000
CFM-CLG:	2,000
%OA:	15%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,060	3,36
HTG HRS ON:	1,696	5,37
H/C HRS ON:	2,764	8,76
CLG HRS SAVED:	2,300	
HTG HRS SAVED:	3,680	ř
C/H HRS SAVED:	5,996	3

ONSTANTS	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS

BLDG: 0301 BUILDING NAME: FINANCE ADMIN
ENERGY CALCULATION SUMMARY

System Type: 11
System Name: Variable Air Volume air handling unit

System Number: AHU-1

FUNCTION	kW/yr ÷	<u>kWh/yr</u>	MBtu/yr N	MH/yr
Schedule ST/SP	0.00	7,254.06	50.01	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	7,303.65	28.11	
Sub Total	2.47	14,926.68	78.12	
Economizer	0.00	131.55	0.00	
Ventilation/Recirculation	0.00	0.00	2.54	
DDC Control	0.00	2,271.66	9.25	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
	0.00	0.00	0.00	
Condenser Water Reset Chiller Demand Limit	0.00	0.00	0.00	
	0.00			5.0
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				/
TOTAL	2.47	17,329.88	89.91	5.0

UMCS UNCTN NO:	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
32	Direct digital control - VAV AHU	0	3	0	11	\$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0 -	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0301	BUILDING NAME: FINANCE ADMIN

Building UA: 7,152

CONDITIONED SQFT:

32,947

#### SYTEM INFORMATION

System Type: 11

System Name: Variable Air Volume air handling unit

System Number: AHU-2

	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks of	Winter: 32	2		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	7	7	7	7	7	8
REQ STOP:	12	16	16	16	16	16	12

7.50	Motor HP:
0.83	HP Effic:
0.80	Load Factor:
10,500	CFM-HTG:
10,500	CFM-CLG:
15%	%OA:
14%	%Area:
(	CHILLER CAP (TONS):
0.00	KW-TON:
0	BLR CAP INPUT (BTUH):
(	BLR CAP OUTPUT (BTUH):

#### REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,060 3,360 HTG HRS ON: 1,696 5,376 H/C HRS ON: 2,764 8,760 2,300 CLG HRS SAVED: HTG HRS SAVED: 3,680

5,996

HOURS CALCULATIONS

C/H HRS SAVED:

<u> DNSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

- 44 W

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

BLDG: 0301 BUILDING NAME: FINANCE ADMIN

#### ENERGY CALCULATION SUMMARY

System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-2

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	32,298.45	262.55	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	38,344.16	131.17	
Sub Total	10.99	72,285.43	393.72	
Economizer	0.00	690.62	0.00	
Ventilation/Recirculation	0.00	0.00	13.35	
DDC Control	0.00	11,926.19	43.16	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00

	TYPICAL SYSTEM	POINT A	ND COS	TSUMM	<b>ARY</b>	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
32	Direct digital control - VAV AHU	0	3	0	11	\$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	4	1	14	\$4,826.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

PRE

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

**DATE**: 16-Sep-95

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0301 BUILDING NAME: FINANCE ADMIN

Building UA: 7,152

CONDITIONED SQFT:

32,947

SYTEM INFORMATION \*\*\*

System Type: 11

System Name: Variable Air Volume air handling unit

System Number: AHU-3

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Winter: 32
Weeks of Summer: 20

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	7	7.	7	7	7	8
REQ STOP:	12	16	16	16	16	16	12

<u>INPUTS</u>	
Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	12,890
CFM-CLG:	12,890
%OA:	15%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,060	3,360
HTG HRS ON:	1,696	5,376
H/C HRS ON:	2,764	8,760
CLG HRS SAVED:	2,300	- ). i
HTG HRS SAVED:	3,680	
C/H HRS SAVED:	5,996	1

CONSTANTS	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
НОАОНС:	40.4
нолон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS

BLDG: 0301 BUILDING NAME: FINANCE ADMIN

ENERGY CALCULATION SUMMARY

System Type: 11

System Name: Variable Air Volume air handling unit

System Number: AHU-3

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	61,914.68	322.32	
Opt ST/SP	0.00	3,149.20	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	21.06	0.00	0.00	
Night Setback	0.00	47,072.02	168.64	
Sub Total	21.06	112,135.91	490.96	
Economizer	0.00	847.81	0.00	
Ventilation/Recirculation	0.00	0.00	16.39	
DDC Control	0.00	14,640.82	55.49	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	21.06	127,624.54	562.84	• 5.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMM/	RY:	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
32	Direct digital control - VAV AHU	0	3	0	11	\$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	4	1	14	\$4,826.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0301	BUILDING NAME:	FINANCE ADMIN	
	Building UA:	7.152	CONDITIONED SQFT:	32,947

#### SYTEM INFORMATION ....

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

#### TYPICAL BUILDING INFORMATION Occupancy Days: Use: Occupancy HRS: Catagory Number: Construction: 0700-1700 M-F 4 SANDSTONE BLOCK ADMINISTRATION Weeks of Winter: 32 20 Weeks of Summer:

(20) Annual Control of the Control o	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	7	7	7	7	7	8
REQ STOP:	12	16	16	16	16	16	12

NPUTS ( )	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	65%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,226,000
BLR CAP OUTPUT (BTUH):	919,700

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,060	3,360
HTG HRS ON:	1,696	5,376
H/C HRS ON:	2,764	8,760
CLG HRS SAVED:	2,300	- !
HTG HRS SAVED:	3,680	
C/H HRS SAVED:	5,996	

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
нолон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 09-Dec-95

PREPARED BY: AJN/AMS

LOCATION: FT. RILEY, KS

BUILDING NAME: FINANCE ADMIN

**ENERGY CALCULATION SUMMARY** 

3 System Type:

BLDG: 0301

Small steam boiler System Name:

System Number: BLR-1

<u>FUNCTION</u>	kW/yr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.
TOTAL	0.00	0.00	0.00 4.

	TYPICAL SYST	EM POINT AN	ID COS	T SUMMA	RY	
UMCS		n.	AO	DI	ΑĪ	COST
TUNCTI NO.	UMCS APPLICATION	DO POINTS 1			POINTS	
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
,						

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0301	BUILDING NAME:	FINANCE ADMIN	
	Building UA:	7.152	CONDITIONED SOFT	32 947

#### SYTEM INFORMATION....

System Type: 8
System Name: Air cooled DX compressor

System Number: CH-1

TYPICAL BUILDI	NG INFORMATION			Marie de la companya
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
4	SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	7	7	7	7	7	8
REQ STOP:	12	16	16	16	16	16	12

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	25
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,060 3,360 HTG HRS ON: 1,696 5,376 H/C HRS ON: 8,760 2,764 CLG HRS SAVED: 2,300 HTG HRS SAVED: 3,680 C/H HRS SAVED: 5,996

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/AMS

BLDG: 0301 BUILDING NAME: FINANCE ADMIN

ENERGY CALCULATION SUMMARY

System Type: 8
System Name: Air cooled DX compressor

System Number: CH-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	437.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	21.04	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	21.04	437.50	0.00 > 3.00

17 Scheduled start/stop control - DX 1 0 1 0	
Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0301	BUILDING NAME	E: FINANCE ADMIN	
Building U	<b>A</b> : 7,152	CONDITIONED SQFT:	32,947

# System Type: 8 System Name: Air cooled DX compressor System Number: CH-2

	ction: Use:	Occupa	incy HRS: Occupancy Days:
4 SANDST	ONE BLOCK ADMINI	STRATION 0700-17	00 M-F

0000 V 10.	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	. 8	7	7	7	7	7	8
REQ STOP:	12	16	16	16	16	16	12

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,060	3,360
HTG HRS ON:	1,696	5,376
H/C HRS ON:	2,764	8,760
CLG HRS SAVED	2,300	j.
HTG HRS SAVED:	3,680	ī
C/H HRS SAVED:	5,996	<del>-</del> i,

<u>ISTANTS</u>	
HOAUHC:	27.
HOAUH:	44.
COAUHC:	
COAUC:	
HOAOHC:	40
НОАОН:	6
COAOHC:	0.00087
COAOC:	0.0023
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.000062
ECHC:	0.000023
NSUCHC:	0.00060
NSUCC:	0.001
DDCCHC:	0.0004
DDCCC:	0.001
NSC:	1310
DDCH:	431
OPT:	3(
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95 **PREPARED BY**: AJN/AMS

BLDG: 0301 BUILDING NAME: FINANCE ADMIN

ENERGY CALCULATION SUMMARY

System Type: 8
System Name: Air cooled DX compressor
System Number: CH-2

FUNCTION	kW/vc	kWh/yr	MBtulyr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	525.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	25.25	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.
TOTAL	25.25	525.00	0.00 3.

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO	T SUMMA  DI POINTS	ARY AI POINTS	COST
	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0.0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

IT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

DATE: 10-3

PREPARED BY: AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0301 BUILDING NAME: FINANCE ADMIN

Building UA: 7,152

CONDITIONED SQFT:

32,947

SYTEM INFORMATION ...

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-3

4	SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F	
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:	
TYPICAL BUILDII	NG INFORMATION	The state of the s			

Weeks of Winter: 32
Weeks of Summer: 20

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	7	7	7	7	7	8
REQ STOP:	12	16	16	16	16	16	12

INPUTS	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	10
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,060	3,360
HTG HRS ON:	1,696	5,376
H/C HRS ON:	2,764	8,760
CLG HRS SAVED:	2,300	
HTG HRS SAVED:	3,680	1
C/H HRS SAVED:	5,996	•

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	. 0
COAUC:	0
HOAOHC:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67
OAK.,	3.07

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 0301 BUILDING NAME: FINANCE ADMIN

orenne.	\$60536535	1059905	1995	200000	255745	22372	3655630	000000	2559650	1655500	200000	250000	90.00m	2000	100400	90000	40000	1999549	UNK MI	SOURCE	GOODS!	00000	100540	99.60%	69293	600000	62333	STANKS.	62
W. O.A.	-								200					255	1						10	100	1.3	2	200	200	20000		Q.
200				ш,	200	W.	13.00	Car	8.0	58.8	£ 400			200	2000	100			ďΡ	200	. 41	8	ы.	и.	и.	3.0		A.	÷
2. 19.	ΕÌ		130	S. 1			253		-	¥ 83	Sec. 500.				. 100	18.	1000	2.3		100	43.				73	-	3.0		F.

System Type: 8
System Name: Air cooled DX compressor
System Number: CH-3

FUNCTION -	kW/yr	kWh/yr	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	175.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	8.42	0.00	0.00	
Remote Monitoring, Maintenance, Run Time,			. ,	3.00
and Safety Alarms TOTAL	8.42	175.00	0.00	3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO	T SUMMA DI POINTS	AI .	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	O	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0301	BUILDING NAME:	FINANCE ADMIN
	D. U.J 114	7.450	CONDITIONED COST

Building UA:	7,152	CONDITIONED SQFT:	32,947
Li		······································	

#### SYTEM INFORMATION

System Type: 5 System Name: Steam to hot water converter

System Number: CV-1

TYPICAL BUILD	ING INFORMATION			
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Winter: 32 Weeks of Summer: 20

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	7,	7	7	7	7	8
REQ STOP:	12	16	16	16	16	16	12

TOTAL SERVICE CONTROL OF A CONT	animan or verification extended
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Агеа:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	919,700
BLR CAP OUTPUT (BTUH):	919,700

		PRESENT HR/YR
CLG HRS ON:	1,060	3,360
HTG HRS ON:	1,696	5,376
H/C HRS ON:	2,764	8,760
CLG HRS SAVED:	2,300	
HTG HRS SAVED:	3,680	
C/H HRS SAVED:	5,996	•

CONSTANTS	•
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 **DATE**: 16-Sep-95

PREPARED BY: AJN/AMS

BLDG: 0301 **BUILDING NAME:** FINANCE ADMIN 

		G١										

System Type:	5	
System Name:	Steam to hot water converter	
System Number:	CV-1	

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	5,631.34	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,098.07	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	5.21	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

**DATE:** 16-Sep-95

EMC NO: 1406-001

**ENERGY CALCULATION PARAMETERS** 

BLDG: 0301 BU	UILDING NAME:	FINANCE ADMIN
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Building UA:	7,152	CONDITIONED SQFT:	32,947

#### SYTEM INFORMATION TO THE SYSTEM INFORMATION

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	8	7	7:	7	7	7	8
REQ STOP:	12	16	16	16	16	16	12

INPUTS	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	65%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

REQUIRED HR/YR	PRESENT HR/YR
1,060	3,360
1,696	5,376
2,764	8,760
2,300	ì
3,680	į
5,996	i :
	1,060 1,696 2,764 2,300 3,680

<u>ONSTANTS</u>	
HOAUHC:	27.
HOAUH:	44.
COAUHC:	
COAUC:	
HOAOHC:	40.
НОАОН:	6
COAOHC:	0.00087
COAOC:	0.0023
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.000062
ECHC:	0.000023
NSUCHC:	0.00060
NSUCC:	0.0016
DDCCHC:	0.00041
DDCCC:	0.0010
NSC:	13100
DDCH:	4310
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS

BLDG: 0301 BUILDING NAME: FINANC	CE ADMIN
ENERGY CALCULATION S	UMMARY

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

FUNCTION	kW/yr	<u>kWh/yr</u>	<u>MBtu/yr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	5,631.34	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,098.07	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				3.0
Maintenance, Run Time,				
and Safety Alarms			i	

UMCS FUNCIN	TYPICAL SYSTEM  UMCS APPLICATION	DO	ÃO	DI	ARY  AI  POINTS	COST
NO.		POINTS	POINTS	POINTS	POINT2	
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
	TOTAL:	1	0	1	1	\$570.00

# BUILDING 302 FINANCE ADMINISTRATION

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0302 BUILDING NAME: FINANCE ADMIN

Building UA: 3,503

CONDITIONED SQFT:

16,138

SYTEM INFORMATION :

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

<u>inputs</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	. 0%
CHILLER CAP (TONS):	3
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	•
C/H HRS SAVED:	6,153	•

CONSTANTS	
HOAUHC:	27.8
HOAUH:	. 44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95 **PREPARED BY**: AJN/DEJ

BLDG: 0302 BUILDING NAME: FINANCE ADMIN

ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	52.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	2.52	0.00	0.00
Remote Monitoring,			3.0
Maintenance, Run Time, and Safety Alarms	!		
TOTAL	2.52	52.50	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO	DI	ARY  AI  POINTS	COST
	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: AJN/DEJ

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0302	BUILDING NAME:	FINANCE ADMIN

Building UA: 3,503 CONDITIONED SQFT: 16,138

#### SYTEM INFORMATION ......

System Type: 11

System Name: Variable Air Volume air handling unit

System Number: AHU-1

#### TYPICAL BUILDING INFORMATION

 Catagory Number:
 Construction:
 Use:
 Occupancy HRS:
 Occupancy Days:

 4 SANDSTONE BLOCK
 ADMINISTRATION
 0700-1700
 M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

# | Motor HP: 15.00 | | HP Effic: 0.87 | | Load Factor: 0.80 | | CFM-HTG: 12,000 | | CFM-CLG: 12,000 | | %OA: 10% |

CFM-CLG:	12,000
%OA:	10%
%Area:	83%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### **HOURS CALCULATIONS**

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	•
C/H HRS SAVED:	6,153	:

	<u>CONSTANTS</u>
27.8	HOAUHC:
44.6	HOAUH:
0	COAUHC:
0	COAUC:
40.4	HOAOHC:
65	НОАОН:
0.000877	COAOHC:
0.00232	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0000629	ECC:
0.0000238	ECHC:
0.000609	NSUCHC:
0.00161	NSUCC:
0.000411	DDCCHC:
0.00109	DDCCC:
131000	NSC:
43100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/DEJ

BLDG: 0302 BUILDING NAME: FINANCE ADMIN

#### ENERGY CALCULATION SUMMARY

System Type: 11

System Name: Variable Air Volume air handling unit

System Number: AHU-1

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	63,529.85	205.26
0.00	3,149.20	0.00
0.00	0.00	0.00
21.06	0.00	0.00
0.00	44,965.08	380.88
21.06	111,644.13	586.14
0.00	744.60	0.00
0.00	0.00	10.17
0.00	12,858.43	125.31
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
,		5.0
	0.00 0.00 0.00 21.06 0.00 21.06 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         63,529.85           0.00         3,149.20           0.00         0.00           21.06         0.00           0.00         44,965.08           21.06         111,644.13           0.00         744.60           0.00         0.00           0.00         12,858.43           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

	TYPICAL SYSTEM POINT AND COST SUMMARY						
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST	
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00	
32	Direct digital control - VAV AHU	0	3	0	11	\$3,695.00	
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00	
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00	
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00	
	TOTAL:	1 3	4	1	14	\$4,826.00	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

ENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ

#### **ENERGY CALCULATION PARAMETERS**

- 1	BLDG: 0302	BUILDING NAME:	FINANCE ADMIN	
	Building UA:	3,503	CONDITIONED SQFT:	16,138

# SYTEM INFORMATION System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

TYPICAL BUILDING INFORMATION							
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:			
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F			

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	- 6	6	0
REQ STOP:	0	16	16	16	16	16	. 0

NPUTS -	
Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	450
CFM-CLG:	450
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,000 3,360 HTG HRS ON: 1,600 5,376 8,760 H/C HRS ON: 2,607 **CLG HRS SAVED:** 2,360 HTG HRS SAVED: 3,776 C/H HRS SAVED: 6,153

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
НОАОНС:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95 **PREPARED BY**: AJN/DEJ

BLDG: 0302 BUILDING NAME: FINANCE ADMIN

#### ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	715.06	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.23	0.00	0.00	
Night Setback	0.00	1,709.82	0.00	
Sub Total	0.23	2,517.29	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	490.50	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0

UMCS UNCTN NO.	' UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/DEJ

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0302 BUILDING NAME: FINANCE ADMIN

Building UA: 3,503

CONDITIONED SQFT: 16,138.

SYTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Winter: 32
Weeks of Summer: 20

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS	
Motor HP:	1.50
HP Effic:	0.37
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	750,000
BLR CAP OUTPUT (BTUH):	600,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	- )
HTG HRS SAVED:	3,776	- i
C/H HRS SAVED:	6,153	<del>-</del> 

<u>ONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	. 44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95 **PREPARED BY**: AJN/DEJ

LOCATION: FT. RILEY, KS

P

BLDG: 0302 BUILDING NAME: FINANCE ADMIN

ENERGY CALCULATION SUMMARY

System Type: 1
System Name: Small hot water boiler

System Number: BLR-1

FUNCTION .	kW/yr	kWh/yr	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	9,135.76	0.00
Opt ST/SP	0.00	737.93	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	9,873.68	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	4.25
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		1	4.00
TOTAL	0.00	9,873,68	4.25 4.00

UMCS: FUNCTN NO:	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	O	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0302	BUILDING NAME:	FINANCE ADMIN	
	Building UA:	3 503	CONDITIONED SOFT:	16 13

# SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

TYPICAL BUILD	DING INFORMATION			
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	25
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0,

#### HOURS CALCULATIONS

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	•

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
НОАОНС:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ

BLDG: 0302	BUILDING NAME: FINANCE ADMIN
	ENERGY CALCULATION SUMMARY
System Type:	8

System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

<u>FUNCTION</u>	kW/yr	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	437.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	21.04	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:		3.00
TOTAL	21.04	437.50	0.00	. 3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO	T SUMM/ DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/DEJ

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0302	BUILDING NAME:	FINANCE ADMIN
		0.500	00117101170077

Building UA: 3,503

CONDITIONED SQFT:

16,138

#### SYTEMINEORWATION ....

System Type: 21

System Name: HW Unit heater

System Number: UH-1-4

TYPICAL BUILD)	NG INFORMATION	Link!		The state of the s
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	2,520
CFM-CLG:	0
%OA:	0%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	HR/YR	HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	-
HTG HRS SAVED:	3,776	:
C/H HRS SAVED:	6,153	!

	<u>CONSTANTS</u>
27.8	HOAUHC:
44.6	HOAUH:
0	COAUHC:
0	COAUC:
40.4	HOAOHC:
65	НОАОН:
0.000877	COAOHC:
0.00232	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0000629	ECC:
0.0000238	ECHC:
0.000609	NSUCHC:
0.00161	NSUCC:
0.000411	DDCCHC:
0.00109	DDCCC:
131000	NSC:
43100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DEJ

BLDG: 0302 BUILDING NAME: FINANCE ADMIN

ENERGY CALCULATION SUMMARY

System Type: 21
System Name: HW Unit heater

System Number: UH-1-4

<b>FUNCTION</b>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtulyr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	1,144.09	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	68.83	
Sub Total	0.00	1,236.51	68.83	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				0.0
Maintenance, Run Time,		· i		
and Safety Alarms	0.00	1,236,51	68.83	0.0
TOTAL	0.00	1,230.31	09.00	**************************************

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO	AO	DI	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

# BUILDING 313 CIVILIAN PERSONNEL BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0313	BUILD	ING NAME:	CIV PERS BLDG	
	Building UA:	1,941		CONDITIONED SQFT:	6,222

#### SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU		ADMINISTRATION	0600-1700	M-F
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0.	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7:	0
REQ STOP:	0	16	16	16	16	16	0

<u>NPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,500
CFM-CLG:	4,500
%OA:	20%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	1
C/H HRS SAVED:	6,414	

	<u>NSTANTS</u>
	HOAUHC:
	HOAUH:
	COAUHC:
	COAUC:
	HOAOHC:
	НОАОН:
	COAOHC:
	COAOC:
0.	DC DUTY:
0.	DC DEMAND:
	ECC:
	ECHC:
0.0001	NSUCHC:
0.0004	NSUCC:
0.0001	DDCCHC:
0.0002	DDCCC:
109	NSC:
325	DDCH:
3	OPT:
1	CHWR:
	CNWR:
5	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: AJN

**DATE**: 16-Sep-95

BLDG: 0313 BUILDING NAME: CIV PERS BLDG

ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	9,814.41	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	5,079.55	21.16	
Sub Total	3.12	15,360.69	21.16	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,172.04	63.08	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

1,941

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0313 BUILDING NAME: CIV PERS BLDG

CONDITIONED SQFT:

6,222

SYTEM NEORMATION

System Type: 8

Building UA:

System Name: Air cooled DX compressor

System Number: CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU	ADMINISTRATION	0600-1700	M-F
Weeks of	Winter:	32		
Weeks of S	Summer:	20		

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

NPUTS	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	14
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	i
C/H HRS SAVED:	6,414	-

<u>ONSTANTS</u>	•
HOAUHC:	(
HOAUH:	(
COAUHC:	. (
COAUC:	(
HOAOHC:	
нолон:	(
COAOHC:	(
COAOC:	(
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	(
ECHC:	(
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	(
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN

BLDG: 0313 BUILDING NAME: CIV PERS BLDG

		:															

System Type: 8
System Name: Air cooled DX compressor
System Number: CH-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	236.25	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	11.36	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	O	\$243.00
	limiting - DX Compressor  TOTAL:	1	0	1	0	\$243.00

# BUILDING 319 GENERAL INSTRUCTION BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY:

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0319 BUILDING NAME: GEN INSTR BLDG

Building UA: 2,244

CONDITIONED SQFT:

9,690

SYTEM NEORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

THE CARTERIES	ING INFORMATION			
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	1 BRICK AND CMU	TRAINING	0700-2100	M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	14,500
CFM-CLG:	14,500
%OA:	20%
%Area:	60%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	) <sub>,</sub>
HTG HRS SAVED:	3,936	5
C/H HRS SAVED:	6,414	-  -

<u>CONSTANTS</u>	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	. 0
COAUC:	0
HOAOHC:	17.3
НОАОН:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

System Number:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

AHU-1

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE:** 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 0319

BUILDING NAME: GEN INSTR BLDG

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	34,545.30	392.45	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	20,552.29	41.07	
Sub Total	10.99	56,740.41	433.51	
Economizer	0.00	2,667.42	0.00	
Ventilation/Recirculation	0.00	0.00	18.66	
DDC Control	0.00	3,126.73	42.95	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			495.12	3.

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

**ENERGY CALCULATION PARAMETERS** 

BLDG:	0319	BUILDING NA	ME: GEN INSTR BLDG	
	Building UA:	2,244	CONDITIONED SQFT:	9,690
YTEN	INFORMATION	THE CONTRACTOR		a de la companya de
	System Type: 1	en e		
	System Name: Small ho	ot water boiler		
	System Number: BI R-1			

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
21	BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter	32		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS -	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	40%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	675,000
BLR CAP OUTPUT (BTUH):	540,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	n.
HTG HRS SAVED:	3,936	i
C/H HRS SAVED:	6,414	-

<u>CONSTANTS</u>	•
HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BUILDING NAME: GEN INSTR BLDG BLDG: 0319 

ENERGY CALCULATION SUMMARY

System Type:

System Name: Small hot water boiler

BLR-1 System Number:

FUNCTION: # 12	kW/yr	kWh/yr + +	<u>MBtwlyr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	6,023.09	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,489.82	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.83	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:		4.00
TOTAL	0.00	6,489.82	3.83	<b>` 4.00</b>

MCS NCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

9,690

LOCATION: FT. RILEY, KS

PREPARED BY:

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0319	BUILDING NAME:	GEN INSTR BLDG

BLDG:	0319	BUILDING NAME:	GEN INSTR BLDG
	Building UA:	2,244	CONDITIONED SQFT:

#### SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

TYPICAL BUILDING INFORMATION						
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:		
21	BRICK AND CMU	TRAINING	0700-2100	M-F		

32 Weeks of Winter: Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	25
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

## REQUIRED PRESENT 360 376 760

!	1117/117		IJIV IIX	
CLG HRS ON	l:	900	)	3,3
HTG HRS ON	l <b>:</b>	1,440	)	5,3
H/C HRS ON	l <b>:</b>	2,346	) 	8,7
CLG HRS SAVED	);	2,460	- ) <sub>:</sub>	
HTG HRS SAVED	):	3,936	, j	
C/H HRS SAVED	):	6,414	į	
			-	

<u>ONSTANTS</u>	•
HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY:

LOCATION: FT. RILEY, KS

BUILDING NAME: GEN INSTR BLDG

ENERGY CALCULATION SUMMARY

System Type: 8

BLDG: 0319

System Name: Air cooled DX compressor

<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
0.00	.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	437.50	0.00
0.00	0.00	0.00
21.04	0.00	0.00
	i .	,
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  - UMCS APPLICATION	DO FOINTS	AO	T SUMMA DI POINTS	ARY AI POINTS	COST
	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95 LOCATION: FT. RILEY, KS

PREPARED BY:

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0319	BUILDING NAME:	GEN INSTR BLDG	
	Building UA:	2,244	CONDITIONED SQFT:	9,690

## SYCHMENEORNATION

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	1 BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0,	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0,	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	2.00
HP Effic:	0.71
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	40%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	- )
HTG HRS SAVED:	3,936	5
C/H HRS SAVED:	6,414	Ī

•	CONSTANTS
21.1	HOAUHC:
34	HOAUH:
. 0	COAUHC:
0	COAUC:
17.3	HOAOHC:
27.9	HOAOH:
0.000885	COAOHC:
0.00234	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000207	ECC:
0.0000784	ECHC:
0.000221	NSUCHC:
0.000584	NSUCC:
0.0000919	DDCCHC:
0.000243	DDCCC:
30500	NSC:
31900	DDCH:
305	OPT:
17.5	CHWR:
C	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG:	0319	BUILDING NAME:	
	ENER	GY CALCULAT	ION SUMMARY

System Type: 25
System Name: Hot water radiation pump

System Number: RAD-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,616.91	0.00	
Opt ST/SP	0.00	512.74	0.00	
Duty Cycle	0.00	0.00	0.00	·
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	7,129.66	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,		r		3.0
Maintenance, Run Time, and Safety Alarms		:	İ	
TOTAL	0.00	7,129.66	0.00	3.00

FUNCTN UMCS APPLICATION DO AO DI AI COST NO. POINTS POINTS POINTS  23 Scheduled start/stop control - HW 1 0 1 1 \$570.00		TYPICAL SYSTEN	I POINT A	ND COS	T SUMM/	<b>NRY</b>	
		UMCS APPLICATION					COST
Pump; Night setback - HW Pump	23	Pump; Optimum start/stop - HW	1	0	1	1	\$570.00

## BUILDING 330 DEH ADMINISTRATION

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 **DATE**: 16-Sep-95

PREPARED BY: AJN/DJ

**ENERGY CALCULATION PARAMETERS** 

BLDG:	0330	BUILDING NAME:	DEH ADMIN
DEDO.	0000	DOILDING MAINE.	

**Building UA:** 3,515

CONDITIONED SQFT:

14,913

#### SYTEM INFORMATION

System Type: 15

LOCATION: FT. RILEY, KS

System Name: Small Single Zone air handling unit

System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Summer:

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0.	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>inputs</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,500
CFM-CLG:	2,500
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	-
HTG HRS SAVED:	3,936	•
C/H HRS SAVED:	6,414	

	State Section Control to the State of the Section Control of the Sec
HOAUHC:	27.
HOAUH:	44.
COAUHC:	
COAUC:	
HOAOHC:	40.
НОАОН:	6
COAOHC:	0.00087
COAOC:	0.0023
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.000062
ECHC:	0.000023
NSUCHC:	0.00060
NSUCC:	0.0016
DDCCHC:	0.00041
DDCCC:	0.0010
NSC:	13100
DDCH:	4310
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/DJ

BLDG: 0330 BUILDING NAME: DEH ADMIN

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

FUNCTION -	KWive	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	7,758.69	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	9,764.66	92.09	
Sub Total	2.47	17,892.32	92.09	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,410.96	30.30	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	:			3.00
TOTAL	2.47	20,303.27	122.39	. 3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/DJ

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0330	BUILDING NAME: DEH ADMIN
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Building UA: 3,515 CONDITIONED SQFT: 14,913

## SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0:80
CFM-HTG:	3,000
CFM-CLG:	3,000
%QA:	0%
%Area:	22%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	:
C/H HRS SAVED:	6,414	•

<u>JNSTANTS</u>	•
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	(
COAUC:	(
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/DJ

BLDG: 0330 BUILDING NAME: DEH ADMIN

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	7,758.69	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	11,717.59	101.30	
Sub Total	2.47	19,845.25	101.30	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,893.15	33.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,		:		3.00
Maintenance, Run Time, and Safety Alarms			:	
TOTAL	2.47	22,738.40	134.63	• 3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME; EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DJ

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0330 BUILDING NAME: DEH ADMIN

Building UA: 3,515 CONDITIONED SQFT:

14,913

SYMEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

EXPICAL BUILDI	NG INFORMATION:			e de la companya de la companya de la companya de la companya de la companya de la companya de la companya de La companya de la co
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
4	SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,950
CFM-CLG:	2,950
%OA:	0%
%Area:	. 17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR	
CLG HRS ON:			
HTG HRS ON:	1,440	5,376	
H/C HRS ON:	2,346	8,760	
CLG HRS SAVED:	2,460		
HTG HRS SAVED:	3,936	:	
C/H HRS SAVED:	6,414	:	

CONSTANTS	•
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/DJ

BLDG: 0330

BUILDING NAME: DEH ADMIN

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

- FUNCTION	≟ kWivr	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	7,758.69	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	11,522.30	78.28	
Sub Total	2.47	19,649.96	78.28	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,844.93	25.75	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,			<del></del> -	3.0
Maintenance, Run Time,				
and Safety Alarms TOTAL	2.47	22.494.88	104.03	` 3.0

	TYPICAL SYSTEM POINT AND COST SUMMARY								
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST			
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00			
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00			
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00			
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00			
	TOTAL:	1	3	0	6	\$2,116.00			

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DJ

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0330	BUILDING NAME:	DEH ADMIN	
	Building UA:	3,515	CONDITIONED SQFT:	14,913

## SYTEM INFORMATION

INFORMATION	10.00
System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-4

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
4	SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks of V	Vinter: 32			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	·0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7.	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,950
CFM-CLG:	2,950
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	Ē
HTG HRS SAVED:	3,936	i
C/H HRS SAVED:	6,414	7

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/DJ

BLDG: 0330 BUILDING NAME: DEH ADMIN

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

FUNCTION	kW/yr	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	7,758.69	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	11,522.30	78.28	
Sub Total	2.47	19,649.96	78.28	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,844.93	25.75	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00:	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				3.00
Maintenance, Run Time, and Safety Alarms	:			
TOTAL	2.47	22,494.88	104.03	, 3.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DJ

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0330	BUILDING N	IAME: DEH ADMIN	
	Building UA:	3,515	CONDITIONED SQFT:	14,913
SYTEM	INFORMATION			San Harris
	System Type:	15		
	System Name:	Small Single Zone air handling uni	it	

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter: 32			
Weeks of S	Summer: 20	Ď.		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	0.25
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	875
CFM-CLG:	875
%ÒA:	0%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/DJ

BLDG: 0330 BUILDING NAME: DEH ADMIN

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	1,472.16	0.00	
Opt ST/SP	0.00	70.01	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.47	0.00	0.00	
Night Setback	0.00	3,417.63	13.81	
Sub Total	0.47	4,959.80	13.81	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	843.83	4.54	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:		3.00
TOTAL	0.47	5,803.64	18.36	3.00

UMCS	TYPICAL SYSTEM					
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	1	3	0	6	\$2,116,00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: AJN/DJ

LOCATION: FT. RILEY, KS

### **ENERGY CALCULATION PARAMETERS**

BLDG: 0330 BUILDING NAME: DEH ADMIN

Building UA: 3,515 CONDITIONED SQFT: 14,913

SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-6

 TYPICAL BUILDING INFORMATION

 Catagory Number:
 Construction:
 Use:
 Occupancy HRS:
 Occupancy Days:

 4 SANDSTONE BLOCK
 ADMINISTRATION
 0700-1700
 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

TUE: SUN: MON: WED: THUR: FRI: SAT: 0 0 0 0 0 PRES START: 0 0 24 24 24 24 24 24 PRES STOP: 24 0 7 7 7 **REQ START:** 0 0 0 16 16 16 16 16 **REQ STOP:** 

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	3,000
CFM-CLG:	3,000
%OA:	0%
%Area:	22%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	•
C/H HRS SAVED:	6,414	

<u>ONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	- 44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95 **PREPARED BY**: AJN/DJ

BLDG: 0330 BUILDING NAME: DEH ADMIN

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

<u>FUNCTION</u>	<u>kWiyr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	7,758.69	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	11,717.59	101.30	
Sub Total	2.47	19,845.25	101.30	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,893.15	33.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	2.47	22,738.40	134.63	. 3.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/DJ

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0330	BUILDING NAME:	DEH ADMIN

**Building UA:** 3,515 CONDITIONED SQFT:

14,913

#### SYTEM INFORMATION ::

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

SYSTEM OPERATING SCHEDULE

Weeks of Summer:

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7.	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

20

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	2
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	,
HTG HRS SAVED:	3,936	1
C/H HRS SAVED:	6.414	!

<u> PNSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: AJN/DJ

**DATE**: 16-Sep-95

BLDG: 0330 BUILDING NAME: DEH ADMIN

ENERGY CALCULATION SUMMARY

System Type: 8

System Name:

Air cooled DX compressor

0.00	.00	0.00	
	0.00	0.00	
	0.00.	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	35.00	0.00	
0.00	0.00	0.00	
1.68	0.00	0.00	
		'	3.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     35.00       0.00     0.00       1.68     0.00	0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     35.00     0.00       0.00     0.00     0.00       1.68     0.00     0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	AO.	T SUMMA  DI  POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/DJ

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0330 BUILDING NAME: DEH ADMIN

Building UA: 3,515

CONDITIONED SQFT:

14,913

SYTEM INFORMATION ....

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-2

 TYPICAL BUILDING INFORMATION

 Catagory Number:
 Construction:
 Use:
 Occupancy HRS:
 Occupancy Days:

 4 SANDSTONE BLOCK
 ADMINISTRATION
 0700-1700
 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

THUR: FRI: SAT: SUN: MON: TUE: WED: 0 0 0 PRES START: 0 0 0 0 24 24 24 24 24 24 24 PRES STOP: 7 7 0 **REQ START:** 0 7 7 7. 16 0 0 16 16 16 16 **REQ STOP:** 

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%QA:	0%
%Area:	0%
CHILLER CAP (TONS):	2
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	7
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0'
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/DJ

BLDG: 0330 BUILDING NAME: DEH ADMIN

**ENERGY CALCULATION SUMMARY** 

System Type: 8
System Name: Air cooled DX compressor
System Number: CH-2

FUNCTION 1	<u>kWlyr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	35.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	1.68	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			:	3.0
TOTAL	1.68	35,00	0.00	' 3.0

UMCS FUNCTN NO.	TYPICAL SYSTEN  UMCS APPLICATION	A POINT A  DO POINTS	AO POINTS	T SUMMA DI POINTS	AI POINTS	COST
	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	4	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DJ

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0330	BUILDING NAME:	DEH ADMIN

Building UA: 3,515 CONDITIONED SQFT: 14,913

#### SYTEM INFORMATION:

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-3

	ING INFORMATION			
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Winter: 32
Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

(4-16-4-2004-)0-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0.	0	0	0.	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7.	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	2
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	7
C/H HRS SAVED:	6,414	.!

CONSTANTS	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/DJ

BLDG: 0330 BUILDING NAME: DEH ADMIN
ENERGY CALCULATION SUMMARY

System Type: 8

Air cooled DX compressor

System Number: CH-3

System Name:

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	35.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	1.68	0.00	0.00
Remote Monitoring,			3.0
Maintenance, Run Time,	1 1		
and Safety Alarms		35.00	0.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/DJ

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0330	BUILDING NAME:	DEH ADMIN
	Duilding 11A	2 545	CONDITIONED COET.

Building UA: 3,515 CONDITIONED SQFT:

14,913

SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-4

	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Catagory Number	: Construction:	Use:	Occupancy HRS:	Occupancy Days:
TYPICAL BUIL	DING INFORMATION			

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

NPUTS:	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	3
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0.

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	- 
HTG HRS SAVED:	3,936	<del>-</del> !:
C/H HRS SAVED:	6,414	-

	<u>CONSTANTS</u>
27.8	HOAUHC:
44.6	HOAUH:
0	COAUHC:
0	COAUC:
40.4	HOAOHC:
65	HOAOH:
0.000877	COAOHC:
0.00232	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0000629	ECC:
0.0000238	ECHC:
0.000609	NSUCHC:
0.00161	NSUCC:
0.000411	DDCCHC:
0.00109	DDCCC:
131000	NSC:
43100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/DJ

BLDG: 0330 BUILDING NAME: DEH ADMIN

ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-4

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	52.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	2.52	0.00	0.00
Remote Monitoring,			3.0
Maintenance, Run Time, and Safety Alarms	:		:
TOTAL	2.52	52.50	0.00 3.0

UMCS FUNCTN NO.	TYPICAL SYSTEN  UMCS APPLICATION	POINT A  DO  POINTS	AND COS AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

PREPARED BY: AJN/DJ

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS **ENERGY CALCULATION PARAMETERS** 

BLDG: 0330

BUILDING NAME: DEH ADMIN

**Building UA:** 

3,515

CONDITIONED SQFT:

14,913

SYTEM INFORMATION ...

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-5

TYPICALEBUILD	ING INFORMATION			
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

32 Weeks of Winter: 20 Weeks of Summer:

SYSTEM OPERATING SCHEDULE

000000000000000000000000000000000000000	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	2
KW-TON:	1.10
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	C

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	-  -  -
HTG HRS SAVED:	3,936	1
C/H HRS SAVED:	6,414	-

HOAUHC: 27.8 HOAUH: 44.6 COAUHC: 0 COAUC: 0 HOAOHC: 40.4 HOAOHC: 0.000877 COAOC: 0.00232 DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0.0000629 ECHC: 0.0000238 NSUCHC: 0.000609 NSUCC: 0.00161 DDCCHC: 0.000411 DDCCHC: 0.00109 NSC: 131000 DDCH: 43100 OPT: 305 CHWR: 17.5 CNWR: 0 OAR: 5.67	<u>CONSTANTS</u>	
COAUHC: 0 COAUC: 0 HOAOHC: 40.4 HOAOH: 65 COAOHC: 0.000877 COAOC: 0.00232 DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0.0000629 ECHC: 0.0000238 NSUCHC: 0.000609 NSUCC: 0.00161 DDCCHC: 0.000411 DDCCHC: 0.00109 NSC: 131000 DDCH: 43100 OPT: 305 CHWR: 17.5	HOAUHC:	27.8
COAUC: 0 HOAOHC: 40.4 HOAOHC: 0.000877 COAOC: 0.00232 DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0.0000629 ECHC: 0.0000238 NSUCHC: 0.000609 NSUCC: 0.00161 DDCCHC: 0.000411 DDCCC: 0.00109 NSC: 131000 DDCH: 43100 OPT: 305 CHWR: 17.5	HOAUH:	44.6
HOAOHC: 40.4  HOAOH: 65  COAOHC: 0.000877  COAOC: 0.00232  DC DUTY: 0.17  DC DEMAND: 0.17  ECC: 0.0000629  ECHC: 0.000629  NSUCHC: 0.000609  NSUCC: 0.00161  DDCCHC: 0.00161  DDCCC: 0.00109  NSC: 131000  DDCH: 43100  OPT: 305  CHWR: 17.5	COAUHC:	0
HOAOH: 65  COAOHC: 0.000877  GOAOC: 0.00232  DC DUTY: 0.17  DC DEMAND: 0.17  ECC: 0.0000629  ECHC: 0.000629  NSUCHC: 0.00161  DDCCHC: 0.00161  DDCCC: 0.00109  NSC: 131000  DDCH: 43100  OPT: 305  CHWR: 17.5	COAUC:	0
COAOHC: 0.000877  COAOC: 0.00232  DC DUTY: 0.17  DC DEMAND: 0.17  ECC: 0.0000629  ECHC: 0.000629  NSUCHC: 0.000609  NSUCHC: 0.00161  DDCCHC: 0.00141  DDCCC: 0.00109  NSC: 131000  DDCH: 43100  OPT: 305  CHWR: 17.5  CNWR: 0	HOAOHC:	40.4
COAOC: 0.00232  DC DUTY: 0.17  DC DEMAND: 0.17  ECC: 0.0000629  ECHC: 0.0000238  NSUCHC: 0.000609  NSUCC: 0.00161  DDCCHC: 0.000411  DDCCC: 0.00109  NSC: 131000  DDCH: 43100  OPT: 305  CHWR: 17.5  CNWR: 0	нолон:	65
DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0.0000629 ECHC: 0.0000238 NSUCHC: 0.00161 DDCCHC: 0.00411 DDCCC: 0.00109 NSC: 131000 DDCH: 43100 OPT: 305 CHWR: 17.5 CNWR: 0	COAOHC:	0.000877
DC DEMAND: 0.17  ECC: 0.0000629  ECHC: 0.0000238  NSUCHC: 0.00161  DDCCHC: 0.000411  DDCCC: 0.00109  NSC: 131000  DDCH: 43100  OPT: 305  CHWR: 17.5  CNWR: 0	COAOC:	
ECC: 0.0000629  ECHC: 0.0000238  NSUCHC: 0.000609  NSUCC: 0.00161  DDCCHC: 0.000411  DDCCC: 0.00109  NSC: 131000  DDCH: 43100  OPT: 305  CHWR: 17.5  CNWR: 0	DC DUTY:	0.17
ECHC: 0.0000238  NSUCHC: 0.000609  NSUCC: 0.00161  DDCCHC: 0.000411  DDCCC: 0.00109  NSC: 131000  DDCH: 43100  OPT: 305  CHWR: 17.5  CNWR: 0	DC DEMAND:	0.17
NSUCHC: 0.000609  NSUCC: 0.00161  DDCCHC: 0.000411  DDCCC: 0.00109  NSC: 131000  DDCH: 43100  OPT: 305  CHWR: 17.5  CNWR: 0	ECC:	0.0000629
NSUCC:         0.00161           DDCCHC:         0.000411           DDCCC:         0.00109           NSC:         131000           DDCH:         43100           OPT:         305           CHWR:         17.5           CNWR:         0	ECHC:	
DDCCHC: 0.000411  DDCCC: 0.00109  NSC: 131000  DDCH: 43100  OPT: 305  CHWR: 17.5  CNWR: 0	NSUCHC:	0.000609
DDCCC: 0.00109  NSC: 131000  DDCH: 43100  OPT: 305  CHWR: 17.5  CNWR: 0	NSUCC:	0.00161
NSC: 131000 DDCH: 43100 OPT: 305 CHWR: 17.5 CNWR: 0	DDCCHC:	0.000411
DDCH:       43100         OPT:       305         CHWR:       17.5         CNWR:       0	DDCCC:	0.00109
OPT: 305 CHWR: 17.5 CNWR: 0	NSC:	131000
CHWR: 17.5 CNWR: 0	DDCH:	43100
CNWR: 0	OPT:	305
	CHWR:	17.5
<b>OAR:</b> 5.67	CNWR:	0
	OAR:	5.67

System Number:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/DJ

BLDG: 0330 BUILDING NAME: DEH ADMIN

ENERGY CALCULATION SUMMARY

System Type: 8
System Name: Air cooled DX compressor

CH-5

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	-
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	35.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	1.68	0.00	0.00	
Remote Monitoring,				3.00
Maintenance, Run Time, and Safety Alarms			:	
TOTAL	1.68	35.00	, 0.00	. 3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/DJ

### **ENERGY CALCULATION PARAMETERS**

		1	
DI DO:	0000	BUILDING NAME:	
BLDG:	0330	BUILDING NAME.	DELI ADIVINA

Building UA: 3,515

CONDITIONED SQFT:

14,913

#### SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-6

TYPICAL BUILD	DING INFORMATION			
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Winter: 32
Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

2-C-2-000000000000000000000000000000000	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7.	7	7	7	7:	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	2
KW-TON:	1.10
BLR CAP INPUT (BTUH):	
BLR CAP OUTPUT (BTUH):	C

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	•
HTG HRS SAVED:	3,936	·
C/H HRS SAVED:	6,414	

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	. 44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
ноаон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/DJ

BLDG: 0330 BUILDING NAME: DEH ADMIN

ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	35.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	1.68	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			
TOTAL	1.68	35.00	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINT A	AO	T SUMM/ DI POINTS	ARY AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

## BUILDING 364 UEMCS HQ

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO**: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0364	BUILDING NAME:	UEMCS HQ	
	Building UA:	676	CONDITIONED SQFT:	744

Building UA.	0,0	
SYTEM NEORMATION		14. The second
System Type: 1	5	
	Small Single Zone air handling unit	

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
Jacagory	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

System Number: AHU-1

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	15	15	15	15	15	0

Motor HP:	0.25
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	950
CFM-CLG:	950
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	(
BLR CAP OUTPUT (BTUH):	

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR 3,360 CLG HRS ON: 900 HTG HRS ON: 5,376 1,440 8,760 2,346 H/C HRS ON: CLG HRS SAVED: 2,460 HTG HRS SAVED: 3,936

C/H HRS SAVED:

6,414

•	CONSTANTS
27.8	HOAUHC:
44.6	HOAUH:
0	COAUHC:
0	COAUC:
40.4	HOAOHC:
65	нолон:
0.000877	COAOHC:
0.00232	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0000629	ECC:
0.0000238	ECHC:
0.000609	NSUCHC:
0.00161	NSUCC:
0.000411	DDCCHC:
0.00109	DDCCC:
131000	NSC:
43100	DDCH:
305	OPT:
17.5	CHWR:
C	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 **DATE:** 16-Sep-95

PREPARED BY:

BLDG: 0364

BUILDING NAME: UEMCS HQ

#### ENERGY CALCULATION SUMMARY

System Type: System Name:

Small Single Zone air handling unit

AHU-1 System Number:

FUNCTION .	kW/yr	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	1,472.16	0.00	
Opt ST/SP	0.00	70.01	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	3,710.57	88.56	
Sub Total	0.00	5,252.74	88.56	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	916.16	29.14	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00 1 3.00
TOTAL	0.00	6,168.91	117.69	3.00

IMCS INCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0364	BUILDING NAME:	UEMCS HQ	
	Building UA:	676	CONDITIONED SQFT:	744

# SYSTEM NEORMATION System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:	
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F	
Weeks o	f Winter: 3	2			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	15	15	15	15	15	0

	V VV
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	3
KW-TON:	1.10
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR 3,360 900 **CLG HRS ON:** 5,376 1,440 HTG HRS ON: 8,760 2,346 H/C HRS ON: CLG HRS SAVED: 2,460 3,936 HTG HRS SAVED: 6,414 C/H HRS SAVED:

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
ноаон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

EMC NO: 1406-001

BUILDING NAME: UEMCS HQ BLDG: 0364 ENERGY CALCULATION SUMMARY

System Type:	i8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	52.50	. 0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	2.52	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.52	52.50	0.00	* 3.00

UMCS UNCTN NO:	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00

# BUILDING 402 ENLISTED BARRACKS W/AS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0402 BU	LDING NAME: ENL BARRACKS W/AS
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Building UA: 5,697 CONDITIONED SQFT: 35,718

#### SYTEM INFORMATION .....

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 6|SANDSTONE BLOCK BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

# SYSTEM OPERATING SCHEDULE

and the state of t	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	. 0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

#### **INPUTS** Motor HP: 7.50 HP Effic: 0.83 0.80 Load Factor: CFM-HTG: 9,325 9,325 CFM-CLG: %OA: 10% 40% %Area: CHILLER CAP (TONS): 0 0.00 KW-TON: 0 BLR CAP INPUT (BTUH): 0 BLR CAP OUTPUT (BTUH):

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	9 [
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17.
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0,
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BUILDING NAME: ENL BARRACKS W/AS BLDG: 0402 

ENERGY CALCULATION SUMMARY

10 System Type: System Name: Multizone air handling unit

AHU-1 System Number:

<u>kWiyr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
0.00	.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
10.99	0.00	0.00	
0.00	0.00	43.07	
10.99	0.00	43.07	
0.00	8,250.39	0.00	
0.00	0.00	0.00	
0.00	7,310.99	85.68	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
:	İ		5.00
	0.00 0.00 10.99 0.00 10.99 0.00 0.00 0.00 0.00 0.00	0.00         .00           0.00         0.00           0.00         0.00           10.99         0.00           10.99         0.00           10.99         0.00           0.00         8,250.39           0.00         0.00           0.00         7,310.99           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         .00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           10.99         0.00         0.00           0.00         0.00         43.07           10.99         0.00         43.07           0.00         8,250.39         0.00           0.00         0.00         0.00           0.00         7,310.99         85.68           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1 - 1	8	1	11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0402	BUILDING NAME	E: ENL BARRACKS W/AS	<b>;</b>
	Building UA:	5,697	CONDITIONED SQFT:	35,718

# SYSTEM INFORMATION: System Type: 10 System Name: Multizone air handling unit

System Name.	Multizone all Handing unit	
System Number:	AHU-2	
		,
TYPICAL BUILDING IN	FORMATION	
	- 1 C - 1 C	

Catagory Number: 0	Construction:		Use:	Occupancy HRS:	Occupancy Days:
6	SANDSTONE BLOCK		BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of W	/inter:	32			
Weeks of Sun	nmer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	. 0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS - AND AND AND AND AND AND AND AND AND AND	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	11,800
CFM-CLG:	11,800
%OA:	10%
%Агеа:	50%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0.

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	; !
HTG HRS SAVED:	0	• •
C/H HRS SAVED:	0	•

<u>NSTANTS</u>	
HOAUHC:	
HOAUH:	
COAUHC:	
COAUC:	
HOAOHC:	8.
нолон:	
COAOHC:	0.0002
COAOC:	0.0007
DC DUTY:	0.
DC DEMAND:	0.
ECC:	0.0002
ECHC:	0.0001
NSUCHC:	· · · · · · · · · · · · · · · · · · ·
NSUCC:	
DDCCHC:	0.00008
DDCCC:	0.0002
NSC:	189
DDCH:	376
OPT:	
CHWR:	1
CNWR:	
OAR:	5.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

#· DACA 01\_04\_D\_0033

LOCATION: FT. RILEY, KS PREPARED BY: JM

BLDG: 0402 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

EMC NO: 1406-001

**DATE:** 16-Sep-95

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-2

<u>FUNCTION</u>	kW/yr .	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	0.00	53.84	
Sub Total	7.46	0.00	53.84	
Economizer	0.00	10,440.17	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	9,251.44	107.10	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,			,	5.00
Maintenance, Run Time, and Safety Alarms	:		1	
TOTAL	7.46	19,691.60	160.94	- 5.00

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	8	1	11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0402	BUILDING NAME:	ENL BARRACKS W/AS

Building UA: 5,697 CONDITIONED SQFT: 35,718

#### SYTEM INFORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-3

atagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

3,360

5,376

8,760

0

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	1,300
CFM-CLG:	1,300
%OA:	25%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### 

CLG HRS SAVED:	
HTG HRS SAVED:	
C/H HRS SAVED:	

HOURS CALCULATIONS

<u>ONSTANTS</u>	
HOAUHC:	C
HOAUH:	C
COAUHC:	C
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: JM

BLDG: 0402 BUILDING NAME: ENL BARRACKS W/AS

#### ENERGY CALCULATION SUMMARY

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-3

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	•
Night Setback	0.00	0.00	10.77	
Sub Total	4.62	0.00	10.77	
Economizer	0.00	1,150.19	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,019.23	21.42	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00

	TYPICAL SYSTEM POINT AND COST SUMMARY							
UMCS FUNCTN NO.	UMCS APPLICATION	DO - POINTS	AO POINTS	DI POINTS	AI POINTS	COST		
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00		
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00		
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00		
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00		
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00		
	TOTAL:	1	8	1	11	\$4,509.00		

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO:** 1406-001 **DATE:** 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0402 BUILDING NAME: ENL BARRACKS W/AS

Building UA: 5,697

CONDITIONED SQFT:

35,718

STEM INFORMATION

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
outagory rvambor.	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	Winter: 3	32		
Weeks of S	Summer: 2	20		

SYSTEM OPERATING SCHEDULE

Profession a local integral of a clusteries	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

arara .	and the same of th
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,627,500
BLR CAP OUTPUT (BTUH):	2,102,000

		PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	]
HTG HRS SAVED:	0	j.
C/H HRS SAVED:	. 0	j i

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 09-Dec-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0402 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 3
System Name: Small steam boiler

System Number: BLR-1

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring,			4
Maintenance, Run Time,		!	
and Safety Alarms		0,00	0.00

UMCS FUNCTN NO.	TYPICAL SYSTE	DO	ID COST AO POINTS	DI	RY AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TOTAL:	4	0	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0402	BUILDING NAME:	ENL BARRACKS W/AS

BLDG: 0402 BUILDING NAME: ENL BARRACKS W/AS	BLDG:	0402	BUILDING NAME:	ENL BARRACKS W/AS	
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CONDITIONED SQFT: **Building UA:** 5,697

35,718

#### SYSTEM INTERRING FIONS

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

#### TYPICALIBUILDING INFORMATION Use: Occupancy HRS: Occupancy Days: Construction: Catagory Number: BARRACKS 0000-2400 M-F; SAT-SUN **6 SANDSTONE BLOCK**

32 Weeks of Winter: Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

NPUTS	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	65
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	-  -
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	)i

	<u>CONSTANTS</u>
0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
8.06	HOAOHC:
13	ноаон:
0.000274	COAOHC:
0.000725	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000267	ECC:
0.000101	ECHC:
0	NSUCHC:
0	NSUCC:
0.0000895	DDCCHC:
0.000237	DDCCC:
18900	NSC:
37600	DDCH:
0	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0402

BUILDING NAME: ENL BARRACKS W/AS

#### **ENERGY CALCULATION SUMMARY**

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

* FUNCTION	<u>kWlyr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.93	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,137.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	54.70	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	55.62	1,137.50	0.00	* 4.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

# BUILDING 403 ADMINSTRATION GENERAL (DESIGN PREP)

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: CWWAJN

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0403	BUILDING NAME:	ADMIN GEN PURP

BLUG:	<del>04</del> 03	BUILDING NAME:	ADMIN GEN PURP
			· · · · · · · · · · · · · · · · · · ·

**Building UA:** 5,072 CONDITIONED SQFT:

18,151

#### SYTEM INFORMATION

System Type: 22

System Name: Heat pump unit

System Number: AHU-1

TYPICAL BUILDI	NG INFORMATION		<b>17. H</b>	
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
4	SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Winter:	32
Weeks of Summer:	20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	3.70
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	8,700
CFM-CLG:	8,700
%OA:	0%
%Area:	50%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	i i
C/H HRS SAVED:	6,153	-

CONSTANTS	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
ноаон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: CWWAJN

BLDG: 0403 BUILDING NAME: ADMIN GEN PURP

ENERGY CALCULATION SUMMARY

System Type: 22
System Name: Heat pump unit

**L** 

System Number: AHU-1

- FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	21,228.90	0.00	
Opt ST/SP	0.00	1,052.33	0.00	***************************************
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.04	0.00	0.00	
Night Setback	0.00	32,599.68	332.22	
Sub Total	7.04	54,880.90	332.22	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,		1		0.00
Maintenance, Run Time, and Safety Alarms		•		
TOTAL	7.04	54,880.90	332.22	0.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop Unitary Equip; Night setback - Unitary Equip	<b>1</b>	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: CWWAJN

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0403 BUILDING NAME: ADMIN GEN PURP	
--	--

Building UA: 5,072 CONDITIONED SQFT: 18,151

#### SYTEMINEORNATION:

System Type: 22
System Name: Heat pump unit
System Number: AHU-2

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLC	CK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:	32			
Weeks of	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	. 0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	12,950
CFM-CLG:	12,950
%OA:	0%
%Area:	50%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR 3,360 CLG HRS ON: 1,000 5,376 HTG HRS ON: 1,600 H/C HRS ON: 2,607 8,760 CLG HRS SAVED: 2,360 HTG HRS SAVED: 3,776 C/H HRS SAVED: 6,153

	<u>CONSTANTS</u>
27.8	HOAUHC:
44.6	HOAUH:
0	COAUHC:
0	COAUC:
40.4	HOAOHC:
65	НОАОН:
0.000877	COAOHC:
0.00232	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0000629	ECC:
0.0000238	ECHC:
0.000609	NSUCHC:
0.00161	NSUCC:
0.000411	DDCCHC:
0.00109	DDCCC:
131000	NSC:
43100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: CWWAJN

BLDG: 0403

BUILDING NAME: ADMIN GEN PURP

ENERGY CALCULATION SUMMARY

System Type: 22
System Name: Heat pump unit

System Number: AHU-2

FUNCTION	<u>kWlyr</u>	kWh/yr	<u>MBtu/yr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	22,500.15	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	48,524.82	332.22	
Sub Total	7.46	72,140.31	332.22	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	ı			0.0
TOTAL	7.46	72,140.31	332.22	• 0.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO	T SUMM/ DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0 =	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: CWWAJN

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0403	BUILDING NAME:	ADMIN GEN PURP

**Building UA:** 5,072 CONDITIONED SQFT: 18,151

#### SYTEM INFORMATION

System Type: 26 System Name: Pump System Number: HWP-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BL	оск	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.73
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0,

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	- 
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	-

•	ONSTANTS
27.	HOAUHC:
44.	HOAUH:
	COAUHC:
	COAUC:
40.	HOAOHC:
6	HOAOH:
0.00087	COAOHC:
0.0023	COAOC:
0.1	DC DUTY:
0.1	DC DEMAND:
0.000062	ECC:
0.000023	ECHC:
0.00060	NSUCHC:
0.0016	NSUCC:
0.00041	DDCCHC:
0.0010	DDCCC:
13100	NSC:
4310	DDCH:
30	OPT:
17.	CHWR:
	CNWR:
5.6	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: CWWAJN

BLDG:	0403		ADMIN GEN PURP
<b>199</b>	Art of the second	ENERGY CALCULAT	ION SUMMARY
		0.0	

System Type:	26	
System Name:	Pump	
System Number:	HWP-1	

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	15,477.45	0.00	
Opt ST/SP	0.00	1,250.16	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	16,727.62	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	:	:		3.00
TOTAL	0.00	16,727,62	0.00	· 3.00

UMCS FUNCTN	TYPICAL SYSTEM  UMCS APPLICATION	POINT A	ND COS AO	T SUMMA Di	RY AI	COST
NO.		POINTS	POINTS	POINTS	POINTS	
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0.	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95 PREPARED BY: CWWAJN

**ENERGY CALCULATION PARAMETERS** 

BLDG:	0403		BUILDING N	AME: ADMIN GEN PURP	
	Building UA:	71	5,072	CONDITIONED SQFT:	18,151
SYTEN	LINFORMATION				
	System Type:	26			1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
	System Type: System Name:		<u> </u>		

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:			
Weeks of S	Summer: 2	20		

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: THUR: FRI: SAT: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 **REQ START:** 0 6 6 6 6 6 0 **REQ STOP:** 0 16 16 16 16 0 16

<u>inputs</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	-  -
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	<del>-</del> ;

	CONSTANTS
27.8	HOAUHC:
44.6	HOAUH:
0	COAUHC:
0	COAUC:
40.4	HOAOHC:
65	HOAOH:
0.000877	COAOHC:
0.00232	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0000629	ECC:
0.0000238	ECHC:
0.000609	NSUCHC:
0.00161	NSUCC:
0.000411	DDCCHC:
0.00109	DDCCC:
131000	NSC:
43100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

DATE: 16-Sep-95
PREPARED BY: CWWAJN

EMC NO: 1406-001

BLDG: 0403 BUILDING NAME: ADMIN GEN PURP

ENERGY CALCULATION SUMMARY

 System Type:
 26

 System Name:
 Pump

 System Number:
 HWP-2

<u>FUNCTION</u>	<u>kWlyr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u>	MH/yr
Schedule ST/SP	0.00	13,808.31	0.00	
Opt ST/SP	0.00	1,115.34	0.00	and the second s
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	14,923.66	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	1			3.00
TOTAL	0.00	14,923.66	0.00	3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: CWWAJN

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0403	BUILDING NAME:	ADMIN GEN PURP	
	Building UA:		CONDITIONED SQFT:	18,151

SYTEMINEORMATION		
System Type:	26	
System Name:	Pump	
System Number:	HWP-3	

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

SYSTEM OPERA	TING S	CHEDU	LE .				
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

<u>NPUTS</u>	
Motor HP:	10.00
HP Effic:	0.75
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	Ī
HTG HRS SAVED:	3,776	3 ()
C/H HRS SAVED:	6,153	

<u>NSTANTS</u>	
HOAUHC:	27.
HOAUH:	44.
COAUHC:	
COAUC:	
HOAOHC:	40.
HOAOH:	6
COAOHC:	0.00087
COAOC:	0.0023
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.000062
ECHC:	0.000023
NSUCHC:	0.00060
NSUCC:	0.0016
DDCCHC:	0.00041
DDCCC:	0.0010
NSC:	13100
DDCH:	4310
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

BLDG: 0403

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: CWWAJN

BUILDING NAME: ADMIN GEN PURP

## ENERGY CALCULATION SUMMARY

 System Type:
 26

 System Name:
 Pump

 System Number:
 HWP-3

<u>FUNCTION</u>	: <u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	30,087.01	0.00	
Opt ST/SP	0.00	2,430.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	32,517.23	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,	1			3.00
Maintenance, Run Time, and Safety Alarms	;			· · · · · · · · · · · · · · · · · · ·
TOTAL	0.00	32,517.23	0.00	. 3.00

UMCS FUNCTO NO:	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO	T SUMMA  DI POINTS	ARY AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	. O	\$386.00
	TOTAL:	1	0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: CWWAJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0403	BUILDING NAM	ΛE:	ADMIN GEN PURP	
	Building UA:	5,072		CONDITIONED SQFT:	18,151

SYTEMINEORNATION	
System Type:	26
System Name:	Pump
System Number:	HWP-4

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLO	CK	ADMINISTRATION	0700-1700	M-F
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

SYSTEMOPERA	TING S	CHEDU	LE .					
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:	
PRES START:	0	0	0	0	0	0	0	
PRES STOP:	24	24	24	24	24	24	24	
REQ START:	0	6	6	6	6	6	0	
REQ STOP:	0	16	16	16	16	16	0	

INPUTS:	
Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	•
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

27.8	HOAUHC:
44.6	HOAUH:
0	COAUHC:
0	COAUC:
40.4	HOAOHC:
65	НОАОН:
0.000877	COAOHC:
0.00232	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0000629	ECC:
0.0000238	ECHC:
0.000609	NSUCHC:
0.00161	NSUCC:
0.000411	DDCCHC:
0.00109	DDCCC:
131000	NSC:
43100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: CWWAJN

BLDG: 0403 BUILDING NAME: ADMIN GEN PURP

## ENERGY CALCULATION SUMMARY

 System Type:
 26

 System Name:
 Pump

 System Number:
 HWP-4

FUNCTION	'kWyr''	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	26,264.76	0.00	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	28,386.26	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				3.00
Maintenance, Run Time, and Safety Alarms			!	
TOTAL	0.00	28,386.26	0.00	3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO	T SUMMA  DI  POINTS	À	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	-0	1	0	\$386.00

# BUILDING 404 ENLISTED BARRACKS W/DAS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

35,718

LOCATION: FT. RILEY, KS

PREPARED BY: AMS/JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0404	BUILDING NAME:	ENL BARRACKS W/DAS	
	Building UA:	5,697	CONDITIONED SQFT:	

# <u>Sytem information</u>

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN

32 Weeks of Winter: 20 Weeks of Summer:

#### SYSTEM OPERATING SCHEDULE

Control of the contro	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

#### <u>INPUTS</u> 15.00 Motor HP: 0.87 HP Effic: 0.80 Load Factor: 8,570 CFM-HTG: 8,570 CFM-CLG: %OA: 15% 43% %Area: CHILLER CAP (TONS): 0 0.00 KW-TON: 0 **BLR CAP INPUT (BTUH):** 0

#### **HOURS CALCULATIONS**

BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	3,360	3,360
HTG HRS ON	5,376	5,376
H/C HRS ON	8,760	8,760
CLG HRS SAVED	: 0	,
HTG HRS SAVED	: 0	)
C/H HRS SAVED		)

NSTANTS	
HOAUHC:	
HOAUH:	
COAUHC:	•
COAUC:	
HOAOHC:	8.0
НОАОН:	1
COAOHC:	0.00027
COAOC:	0.00072
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00026
ECHC:	0.00010
NSUCHC:	
NSUCC:	
DDCCHC:	0.00008
DDCCC:	0.00023
NSC:	1890
DDCH:	3760
OPT:	
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AMS/JM

BLDG: 0404 BUILDING NAME: ENL BARRACKS W/DAS

#### ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

<u>FUNCTION</u>	<u>kWiyr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	21.06	0.00	0.00
Night Setback	0.00	0.00	46.30
Sub Total	21.06	0.00	46.30
Economizer	0.00	7,582.39	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	6,719.05	92.11
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	:	3.00
TOTAL	21.06	14,301.44	138.41

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AMS/JM

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0404	BUILDING NA	ME: ENL BARRACKS W/DAS	
Building UA:	5,697	CONDITIONED SQFT:	35,718
SYTEM INFORMATION -			

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	7,070
CFM-CLG:	7,070
%OA:	15%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 3,360 3,360 HTG HRS ON: 5,376 5,376 H/C HRS ON: 8,760 8,760 CLG HRS SAVED: 0 HTG HRS SAVED: 0 C/H HRS SAVED: 0

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AMS/JM

BLDG: 0404 BUILDING NAME: ENL BARRACKS W/DAS

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	21.06	0.00	0.00
Night Setback	0.00	0.00	37.69
Sub Total	21.06	0.00	37.69
Economizer	0.00	6,255.25	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	5,543.02	74.97
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:	3.0

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	1	3	0	. 6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AMS/JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0404	BUILDING NAME:	ENL BARRACKS W/DAS

BLDG:	0404	BUILDING NAME: ENL BARRACKS WIDAS

**Building UA:** 5,697 CONDITIONED SQFT:

35,718

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	Winter:	32		
Weeks of S	Summer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	2,000
CFM-CLG:	2,000
%OA:	15%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESEN	T
	HR/YR	HR/YR	
CLG HRS ON:	3,360		3,360
HTG HRS ON:	5,376	:	5,376
H/C HRS ON:	8,760		8,760
CLG HRS SAVED:		)	
HTG HRS SAVED:	C	- )·	
C/H HRS SAVED:			

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AMS/JM

BLDG: 0404 BUILDING NAME: ENL BARRACKS W/DAS

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtwyr MH	ŊŢ
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	10.77	
Sub Total	4.62	0.00	10.77	
Economizer	0.00	1,769.52	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,568.04	21.42	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				3.
Maintenance, Run Time, and Safety Alarms				274 <b>8</b> 3

TYPICAL SYSTEM POINT AND COST SUMMARY						
UMCS FUNCIN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

16-Sep-95 DATE:

AMS/JM PREPARED BY:

### **ENERGY CALCULATION PARAMETERS**

BUILDING NAME: ENL BARRACKS W/DAS BLDG: 0404

> **Building UA:** 5,697

CONDITIONED SQFT:

35,718

<u>Sytem information</u> ...

System Type: 15

System Name: Small Single Zone air handling unit

0

24

System Number: AHU-4

TYPICAL BUILDING INFORMATION

Catagory Number: Construction:

**6 SANDSTONE BLOCK** 

BARRACKS

Use:

0

0

32 20 Occupancy HRS:

Occupancy Days:

0

0

0

5.67

SAT:

0

0

0000-2400

M-F; SAT-SUN

Weeks of Winter: Weeks of Summer:

SYSTEM OPERATING SCHEDULE

MON: SUN: TUE: WED: 0 0 PRES START: PRES STOP: 24 24

0

24

**REQ START: REQ STOP:** 

0 0 0 24 24 24 24 24 0 0 0 0 24 24 24 24

THUR:

FRI:

**INPUTS** 3.00 Motor HP: 0.79 **HP Effic:** 0.80 Load Factor:

2,360 CFM-HTG: 2,360 CFM-CLG: %OA: 10% 12% %Area: 0 CHILLER CAP (TONS): 0.00

KW-TON:

**BLR CAP INPUT (BTUH):** BLR CAP OUTPUT (BTUH):

**HOURS CALCULATIONS** 

PRESENT REQUIRED HR/YR HR/YR 3,360 3,360 CLG HRS ON: HTG HRS ON: 5,376 5,376 8,760 8,760 H/C HRS ON: Ò

**CLG HRS SAVED:** HTG HRS SAVED: 0 0 C/H HRS SAVED:

CONSTANTS

0 COAUHC: COAUC: 0 8.06 HOAOHC: 13 HOAOH: 0.000274 COAOHC: 0.000725 COAOC: DC DUTY: 0.17 DC DEMAND: 0.17 0.000267 ECC: 0.000101 ECHC: **NSUCHC:** 0 Ö NSUCC: DDCCHC: 0.0000895 DDCCC: 0.000237 18900 NSC: DDCH: 37600 OPT: 0 17.5 CHWR:

CNWR:

OAR:

HOAUHC:

HOAUH:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AMS/JM

BUILDING NAME: ENL BARRACKS W/DAS

ENERGY CALCULATION SUMMARY

System Type: 15

0404

BLDG:

System Name: Small Single Zone air handling unit

System Number: AHU-4

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	12.92	
Sub Total	4.62	0.00	12.92	
Economizer	0.00	2,088.03	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,850.29	25.70	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4,62	3,938.32	38.63	3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 09-Dec-95

PREPARED BY: AMS/JM LOCATION: FT. RILEY, KS

# **ENERGY CALCULATION PARAMETERS**

BUILDING NAME: ENL BARRACKS W/DAS BLDG: 0404

CONDITIONED SQFT:

**Building UA:** 5.697 35,718

#### SYTEM INFORMATION

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter: 32 20 Weeks of Summer:

# SYSTEM OPERATING SCHEDULE

" - Photograph and American	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

NPUTS	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	963,000
BLR CAP OUTPUT (BTUH):	770,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	_ F
HTG HRS SAVED:	0	Ī
C/H HRS SAVED:	0	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
нолон:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AMS/JM

BLDG: 0404 BUILDING NAME: ENL BARRACKS W/DAS

ENERGY CALCULATION SUMMARY

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

FUNCTION .	kWlyr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	:	:	4.00
TOTAL	0.00	0.00	0.00 4.0

UMCS BUNCTI NO.	TYPICAL SYSTE  UMCS APPLICATION	DO	ND COST AO POINTS	DI	RY AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TOTAL:	1	0	3.	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE:** 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: AMS/JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0404	BUILDING NAME:	ENL BARRACKS W/DAS	
	Building UA:	5,697	CONDITIONED SQFT:	35,718

### SYTEM INFORMATION

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

TYPICAL BUILD	ING INFORMATIO	N			
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	K	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	of Winter:	32			
Weeks of	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS .	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	45
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	3,360	3,360
HTG HRS ON	5,376	5,376
H/C HRS ON	8,760	8,760
CLG HRS SAVED	. 0	
HTG HRS SAVED	: 0	<del>.</del>
C/H HRS SAVED:	. 0	•

	Companies and the company of the com
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
нолон:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0,000
CHWR:	17.5
CNWR:	
	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AMS/JM

BLDG: 0404 BUILDING NAME: ENL BARRACKS W/DAS

ENERGY CALCULATION SUMMARY

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.73	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	1.73	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	787.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	37.87	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.(
TOTAL	39.60	787.50	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
	TOTAL?	2	- 0	-3	2	\$1,481.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: AMS/JM

DATE: 16-Sep-95

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0404	BUILDING NAME:	ENL BARRACKS W/DAS	
	Building UA:	5,697	CONDITIONED SQFT:	35,718

# SYTEM INFORMATION

System Type: 6

System Name: Small air cooled chiller

System Number: CH-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter: 3	2		
	f Winter: 33 Summer: 26			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	. 0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	20
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	. 0	i
C/H HRS SAVED:	0	: !

_	HOALUIO
0	HOAUHC:
0	HOAUH:
. 0	COAUHC:
0	COAUC:
8.06	HOAOHC:
13	HOAOH:
0.000274	COAOHC:
0.000725	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000267	ECC:
0.000101	ECHC:
0	NSUCHC:
0	NSUCC:
0.0000895	DDCCHC:
0.000237	DDCCC:
18900	NSC:
37600	DDCH:
0	OPT:
17.5	CHWR:
	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95 PREPARED BY: AMS/JM LOCATION: FT. RILEY, KS

BLDG: 0404

BUILDING NAME: ENL BARRACKS W/DAS

EMC NO: 1406-001

# ENERGY CALCULATION SUMMARY

System Type:

Small air cooled chiller System Name:

System Number: CH-2

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.66	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.66	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	350.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	16.83	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.
TOTAL	17.49	350.00	0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	O	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AMS/JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0404	BUILDING NAME:	ENL BARRACKS W/DAS
F			

Building UA: 5,697

CONDITIONED SQFT:

35,718

# SYTEM INFORMATION

System Type: 27

System Name: Perimeter radiation valve

System Number: RAD-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	. 0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

### INPUTS

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	: 3,360	3,360
HTG HRS ON	5,376	5,376
H/C HRS ON	: 8,760	8,760
CLG HRS SAVED	: 0	- 
HTG HRS SAVED	: 0	ī.
C/H HRS SAVED	: 0	- 

#### CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AMS/JM

BLDG: 0404 BUILDING NAME: ENL BARRACKS W/DAS

ENERGY CALCULATION SUMMARY

System Type: 27

System Name: Perimeter radiation valve

System Number: RAD-1

FUNCTION .	<u>kWlyr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.00	0.00	0.00

UMCS FUNCEN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	ND COS AO POINTS	T SUMM/ DI POINTS	ARY  AI  POINTS	COST
25	Optimum start/stop - Perimeter Rad Valve; Night setback - Perimeter Rad Valve	0	1	0	1	\$456.00
	TOTAL:	0		0		\$456.00

# BUILDING 405 ADMINISTRATION GENERAL PURPOSE

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

10,778

**ENERGY CALCULATION PARAMETERS** 

BLDG:	0405	BUILDING NAME	: ADMIN GEN PURP
	Building UA:	3,012	CONDITIONED SQFT:

## SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

	ING INFORMATION		Selection of the select	Occupancy UPS:	Occupancy Days:
Catagory Number:	Construction: 4SANDSTONE BLOCK		Use: ADMINISTRATION	Occupancy HRS: 0700-1700	M-F
Weeks o	f Winter: 3	32			
Weeks of S	Summer: 2	20			

# SYSTEM OPERATING SCHEDULE

99-99-04 (CO000-96-1-99-0-) - 1-99-0-) - 1-99-0-) - 1-99-0-) - 1-99-0-) - 1-99-0-) - 1-99-0-) - 1-99-0-) - 1-9	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,000
CFM-CLG:	4,000
%OA:	100%
%Area:	65%
CHILLER CAP (TONS):	
KW-TON:	0.00
BLR CAP INPUT (BTUH):	(
BLR CAP OUTPUT (BTUH):	

### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED	2,360	
HTG HRS SAVED	3,776	
C/H HRS SAVED	6,153	Ī

<u>NSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
НОАОНС:	40.4
нолон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0405 BUILDING NAME: ADMIN GEN PURP

# ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit

System Number: AHU-1

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	9,415.45	684.20	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	14,988.36	256.47	
Sub Total	3.12	24,870.54	940.67	
Economizer	0.00	248.20	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	4,286.14	84.38	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.12	29,404.88	1,025.05	3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95 PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0405		BUILDING NAME:	ADMIN GEN PURP	
	Building UA:	3,012	CONDITIONED SQFT:	10,778
M 1 1 L-11	INFORMATION		en en en en en en en en en en en en en e	

NO-A MICAUSTIC SO FIGURE ASSESSMENT VIOLENCE

TYPICAL BUILD	ING INFORMATION	ļ			
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK		ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:	32			
Weeks of	Summer:	20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUIS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	960,000
BLR CAP OUTPUT (BTUH):	800,000

	REQUIRED	<b>PRESENT</b>
	HR/YR	HR/YR
CLG HRS ON:	1,00	0 3,360
HTG HRS ON:	1,60	0 5,376
H/C HRS ON:	2,60	7 8,760
CLG HRS SAVED:	2,36	0
HTG HRS SAVED:	3,77	6
C/H HRS SAVED:	6,15	3

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR;	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0405 BUILDING NAME: ADMIN GEN PURP

ENERGY CALCULATION SUMMARY

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

FUNCTION _	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00,	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	5.44
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.00
TOTAL	0.00	0.00	5.44 4.00

	TYPICAL SYSTEM POINT AND COST SUMMARY						
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST	
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00	
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00	
4	Alarms - HW Boiler	0	0	2	0	\$330.00	
	TOTAL:	2	0	2	3	\$1,443.00	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0405	BUILDING N	AME: ADMIN GEN PURP	
	Building UA:	3,012	CONDITIONED SQFT:	10,778
SYTEM	INFORMATION	College College College		
	System Type: 6			

YI CHINI YIMBANYA A A MARKATANIA
System Type: 6
System Name: Small air cooled chiller
System Number: CH-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOC	CK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:	32	•		
Weeks of	Summer:	20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0.	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	58
KW-TON:	1.10
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	)
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	. 44.6
COAUHC:	0
COAUC:	0
нолонс:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: JM/AJN/AMS

**DATE:** 16-Sep-95

BUILDING NAME: ADMIN GEN PURP

BLDG: 0405 

ENERGY CALCULATION SUMMARY

6 System Type:

System Name: Small air cooled chiller

CH-1 System Number:

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	1,015.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	48.81	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4
TOTAL	48.81	1,015.00	0.00

	TYPICAL SYSTEM	POINT A	ND COS	TSUMM	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
	TOTAL:	2	0	3	2	\$1,481.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

### **ENERGY CALCULATION PARAMETERS**

BLDG: 0405 BUILDING NAME: ADMIN GEN PURP

Building UA: 3,012 CONDITIONED SQFT: 10,778

#### SYTEM INFORMATION

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 4 SANDSTONE BLOCK ADMINISTRATION 0700-1700 M-F Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	4.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### **HOURS CALCULATIONS** PRESENT REQUIRED HR/YR HR/YR CLG HRS ON: 1,000 3,360 HTG HRS ON: 1,600 5,376 2,607 8,760 H/C HRS ON: CLG HRS SAVED: 2,360 HTG HRS SAVED: 3,776 C/H HRS SAVED: 6,153

CONSTANTS	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 0405 BUILDING NAME: ADMIN GEN PURP

ENERGY CALCULATION SUMMARY

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

FUNCTION	<u>kW/yr</u>	kWh/yr	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	18,830.90	0.00
Opt ST/SP	0.00	933.46	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	6.24	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	6.24	19,764.35	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	6.24	19,764.35	0.00 3.0

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
	TOTAL:	1	0	1	4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0405	BUILDING NAME:	ADMIN GEN PURP	
1	Building UA:	3,012	CONDITIONED SQFT:	10,778

# SYTEM INFORMATION :

System Type: 19

System Name: Fan coil unit

System Number: FC-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BI	-OCK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	. 0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	. 7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	3,200
CFM-CLG:	3,200
%OA:	0%
%Area:	19%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	)
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	-

<u>ONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	C
COAUC:	O
НОАОНС:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0405 BUILDING NAME: ADMIN GEN PURP

ENERGY CALCULATION SUMMARY

System Type: 19
System Name: Fan coil unit

System Number: FC-1

kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	1,864.26	0.00
0.00	92.41	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	11,990.69	74.97
0.00	13,947.36	74.97
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		0. 74.97
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         1,864.26           0.00         92.41           0.00         0.00           0.00         0.00           0.00         11,990.69           0.00         13,947.36           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMMA DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	<b>2</b>	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0405	BUILDING NAME:	ADMIN GEN PURP
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Building UA: 3,012

CONDITIONED SQFT:

10,778

#### SYTEM INFORMATION:

System Type: 19

System Name: Fan coil unit

System Number: FC-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

### SYSTEM OPERATING SCHEDULE

Weeks of Summer:

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

20

<u>INPUTS</u>	
Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	=
C/H HRS SAVED:	6,153	-

<u>ONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 0405 BUILDING NAME: ADMIN GEN PURP

ENERGY CALCULATION SUMMARY

System Type: 19

System Name: Fan coil unit

System Number: FC-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u> ;	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	1,864.26	0.00
Opt ST/SP	0.00	92.41	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	13,114.81	63.13
Sub Total	0.00	15,071.49	63.13
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			0.0

UMCS FUNCTN	TYPICAL SYSTEM  UMCS APPLICATION	POINT A	ND COS	T SUMMA	AT	COST
NO.		POINTS	POINTS	POINTS	POINTS	
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL	7.1	0	1	2	\$1,213.00

# **BUILDING 406 CID BUILDING**

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0406	BUILDING NAME:	CID BLDG

**Building UA:** 3,389 CONDITIONED SQFT: 10,390

NTEM INFORMATION

System Type: 33

System Name: Multizone AHU with Humidification

System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

### SYSTEM OPERATING SCHEDULE

Weeks of Summer:

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

20

<u>inputs</u>	
Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,130
CFM-CLG:	6,130
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	]
C/H HRS SAVED:	6,153	

	<u>CONSTANTS</u>
27.8	HOAUHC:
44.6	HOAUH:
0	COAUHC:
0	COAUC:
40.4	HOAOHC:
65	ноаон:
0.000877	COAOHC:
0.00232	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0000629	ECC:
0.0000238	ECHC:
0.000609	NSUCHC:
0.00161	NSUCC:
0.000411	DDCCHC:
0.00109	DDCCC:
131000	NSC:
43100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 09-Dec-95

PREPARED BY: AJN/CWW

BLDG: 0406 BUILDING NAME: CID BLDG

# **ENERGY CALCULATION SUMMARY**

System Type: 33

System Name: Multizone AHU with Humidification

System Number: AHU-1

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/y	<b>T</b>
Schedule ST/SP	0.00	33,141.02	104.85	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	22,969.66	443.96	
Sub Total	10.99	57,753.50	548.81	
Economizer	0.00	380.37	0.00	
Ventilation/Recirculation	0.00	0.00	5.20	
DDC Control	0.00	6,568.51	146.07	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.
TOTAL	10.99	64,702.38	700.08	<b>5.</b>

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	(RY	
LIMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	ÃO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
38	Direct digital control - Multizone AHU with Humidification	0	8	0	9	\$3,947.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	9	1	12	\$5,078.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS DATE: 09-Dec-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0406 BUILDING NAME: CID BLDG

Building UA: 3,389 CO

3,389 **CONDITIONED SQFT**: 10,390

SYTEM INFORMATION

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:
4 SANDSTONE BLOCK ADMINISTRATION 0700-1700 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

SUN: MON: TUE: WED: THUR: FRI: SAT: 0 0. 0 0 PRES START: 0 0 0 24 PRES STOP: 24 24 24 24 24 24 0 7 7 0 **REQ START:** 0 17 17 17 17 17 0 **REQ STOP:** 

**NPUTS** 0.00 Motor HP: 0.00 HP Effic: 0.80 Load Factor: 0 CFM-HTG: CFM-CLG: 0 0% %OA: 0% %Area: 0 **CHILLER CAP (TONS):** 0.00 KW-TON: 688,000 **BLR CAP INPUT (BTUH):** BLR CAP OUTPUT (BTUH): 550,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	1 
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	1

ONSTANTS	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	(
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 0406 BUILDING NAME: CID BLDG
ENERGY CALCULATION SUMMARY

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,		:		4.00
Maintenance, Run Time,				
and Safety Alarms TOTAL	0.00	0.00	0.00	4.00

	AND DESCRIPTION OF THE PERSON	ICAL SYSTEM	POINT A	VD COST	SUMMA	RY	
UMCS FUNCTI		LICATION	DO	AO	DI	ΑI	COST
NO.			POINTS	POINTS	POINTS	POINTS	<b>\$</b> 1,015.00
	Steam Boiler Moni	itoring	 	U	<b>3</b>	1 <del>47 - 18</del> 0	\$1,015.00
		TOTAL:	1	0	3 -	4	\$1.015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95 PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0406		BUILDING NAME:	CID BLDG	
	Building UA:	3	3,389 <sup>,</sup>	CONDITIONED SQFT:	10,390

# SYTEM INFORMATION System Type: 8 System Name: Air cooled DX compressor System Number: CH-1

TYPICAL BUILDING INFORMATION						
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:	
	4 SANDSTONE BLOCK		ADMINISTRATION	0700-1700	M-F	
Weeks o	f Winter:	32				
Weeks of Summer: 20						

#### SYSTEM OPERATING SCHEDULE TUE: THUR: SUN: MON: SAT: WED: FRI: PRES START: 0. 0 0 0 0 24 24 PRES STOP: 24 24 24 24 24 0 7 7 7 **REQ START:** 0 17 17 REQ STOP: 0 17 17

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	C
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	20
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	C

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	_
HTG HRS SAVED:	3,776	- i
C/H HRS SAVED:	6,153	i

<u>INSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
ноаон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: AJN/CWW

**DATE**: 16-Sep-95

BLDG: 0406

BUILDING NAME: CID BLDG

ENERGY CALCULATION SHIP

**ENERGY CALCULATION SUMMARY** 

System Type: 8
System Name: Air cooled DX compressor

System Number: CH-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>N</u>	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	350.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	16.83	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00

UMCS	TYPICAL SYSTEM	POINT A	AND COS	TSUMMA	(RY	
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	Ö	\$243.00

# BUILDING 409 ENLISTED BARRACKS W/AS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: JM

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0409	BUILDING NAME:	ENL BARRACKS W/AS	
	Building UA:	5,245	CONDITIONED SQFT:	32,883

# SYTEM INFORMATION

System Type: 10 System Name: Multizone air handling unit

System Number: AHU-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BL	оск	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	1,950
CFM-CLG:	1,950
%OA:	14%
%Area:	11%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 3,360 3,360 HTG HRS ON: 5,376 5,376 8,760 8,760 H/C HRS ON: CLG HRS SAVED: 0 HTG HRS SAVED: 0 C/H HRS SAVED: 0

	<u>CONSTANTS</u>
0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
8.06	НОАОНС:
13	ноаон:
0.000274	COAOHC:
0.000725	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000267	ECC:
0.000101	ECHC:
0	NSUCHC:
0	NSUCC:
0.0000895	DDCCHC:
0.000237	DDCCC:
18900	NSC:
37600	DDCH:
0	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0409 BUILDING NAME: ENL BARRACKS W/AS

**ENERGY CALCULATION SUMMARY** 

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

0.00	00		
	.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
1.76	0.00	0.00	
0.00	0.00	10.90	
1.76	0.00	10.90	
0.00	1,725.28	0.00	
0.00	0.00	0.00	
0.00	1,528.84	21.69	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			5.0
	1.76 0.00 1.76 0.00 0.00 0.00 0.00 0.00 0.00	1.76     0.00       0.00     0.00       1.76     0.00       0.00     1,725.28       0.00     0.00       0.00     1,528.84       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00	1.76       0.00       0.00         0.00       0.00       10.90         1.76       0.00       10.90         0.00       1,725.28       0.00         0.00       0.00       0.00         0.00       1,528.84       21.69         0.00       0.00       0.00         0.00       0.00       0.00         0.00       0.00       0.00         0.00       0.00       0.00         0.00       0.00       0.00         0.00       0.00       0.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0409	BUILDING NAME: ENL BARRACKS W/AS
		CONDITIONED COST

Building UA: 5,245

CONDITIONED SQFT: 32,883

# SYTEM INFORMATION ...

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32	•	
Weeks of S	Summer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	. 0	0	0	0	0	0	. 0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,565
CFM-CLG:	3,565
%OA:	14%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR 3,360 CLG HRS ON: 3,360 5,376 HTG HRS ON: 5,376 H/C HRS ON: 8,760 8,760 **CLG HRS SAVED:** 0 0 HTG HRS SAVED: 0 C/H HRS SAVED:

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**EMC NO**: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: JM

BLDG: 0409 BUILDING NAME: ENL BARRACKS W/AS

### **ENERGY CALCULATION SUMMARY**

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-2

FUNCTION	<u> </u>	kWh/yr	MBtu/yr MH/y	
Schedule ST/SP	0.00	.00	0.00	<u>X HOTEL GUARTE</u>
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	7.93	
Sub Total	3.12	0.00	7.93	
Economizer	0.00	3,154.17	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,795.03	15.78	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00

UMCS FUNCTN	TYPICAL SYSTEM UMCS APPLICATION	DO	ÃO	<b>DI</b>	<b>A</b> I	COST
NO.		POINTS	POINTS	POINTS	POINTS	
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:		8	71		\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95

32,883

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0409	BUILDING NAME:	ENL BARRACKS W/AS
BLDG:	0409	BUILDING NAME:	ENL BARRACKS W/AS

Building UA: 5,245. CONDITIONED SQFT:

### SYTEM INFORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-3

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	of Winter: 3	2		

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

0

#### INPUTS Motor HP: 3.00 HP Effic: 0.79 Load Factor: 0.80 CFM-HTG: 6,115 CFM-CLG: 6,115 %OA: 14% %Area: 16% **CHILLER CAP (TONS):** 0 KW-TON: 0.00 **BLR CAP INPUT (BTUH):** 0

#### **HOURS CALCULATIONS**

**BLR CAP OUTPUT (BTUH):** 

	REQUIRED HR/YR	HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

#### **CONSTANTS** HOAUHC: 0 HOAUH: 0 0 COAUHC: COAUC: 0 HOAOHC: 8.06 HOAOH: 13 COAOHC: 0.000274 COAOC: 0.000725 DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0.000267 ECHC: 0.000101 NSUCHC: 0 **NSUCC:** 0 0.0000895 DDCCHC: DDCCC: 0.000237 NSC: 18900 DDCH: 37600 OPT: 0 CHWR: 17.5 CNWR: 0 OAR: 5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO**: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0409

BUILDING NAME: ENL BARRACKS W/AS

# ENERGY CALCULATION SUMMARY

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-3

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	15.86	
Sub Total	4.62	0.00	15.86	
Economizer	0.00	5,410.31	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	4,794.28	31.55	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.0

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	8	1	11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95 **PREPARED BY**: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0409	BUILDING NAME:	ENL BARRACKS W/AS	
	Building UA:	5,245	CONDITIONED SQFT:	32,883

# SYTEM INFORMATION

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-4

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	of Winter:	32		
Weeks of	Summer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0.	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	. 0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	15,075
CFM-CLG:	15,075
%OA:	14%
%Area:	24%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	3,360	3,360
HTG HRS ON	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED		- )
HTG HRS SAVED	. 0	)
C/H HRS SAVED:	: C	)

HOAUHC:	
	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	
	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS PREPARED BY: JM

BLDG: 0409

BUILDING NAME: ENL BARRACKS W/AS

# **ENERGY CALCULATION SUMMARY**

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-4

FUNCTION	kW/yr -	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	0.00	23.79	
Sub Total	10.99	0.00	23.79	
Economizer	0.00	13,337.76	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	11,819.10	47.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.0
TOTAL	10.99	25,156.86	71.12	5.0

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	<b>VRY</b>	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	_ AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	8	1	11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0409	BUILDING NAME: ENL BARRACKS W/AS

**Building UA:** 5,245 CONDITIONED SQFT:

32,883

#### SYTEM INFORMATION

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

#### TYPICAL BUILDING INFORMATION

Catagory Number: Construction:		Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN

32 Weeks of Winter: Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

Biologic School Street and Control Street Street Street Street Street Street	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	25%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,186,000
BLR CAP OUTPUT (BTUH):	1,749,000

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	C	- }i
HTG HRS SAVED:	C	)
C/H HRS SAVED:	C	$ ilde{\mathbf{p}}_i^{ ilde{i}}$

	<u>CONSTANTS</u>
	HOAUHC:
	HOAUH:
1	COAUHC:
	COAUC:
8.0	HOAOHC:
1:	ноаон:
0.00027	COAOHC:
0.00072	COAOC:
0.1	DC DUTY:
0.1	DC DEMAND:
0.00026	ECC:
0.00010	ECHC:
	NSUCHC:
	NSUCC:
0.000089	DDCCHC:
0.00023	DDCCC:
1890	NSC:
3760	DDCH:
	OPT:
17.	CHWR:
	CNWR:
5.6	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0409 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

FUNCTION *	kW/yr l	(Wh/yr	MBtu/vr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			1	4.00
TOTAL	0.00	0.00	0.00	4.00

UMCS FUNCTI NO:		<b>DO</b>	ID COST AO POINTS	DI .	RY AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TOTAL	4	0	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0409	BUILDING NAME:	ENL BARRACKS W/AS

Building UA: 5,245

CONDITIONED SQFT:

32,883

#### SYTEM INFORMATION

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

# TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	'Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	C
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	C

#### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	•
C/H HRS SAVED:	0	

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0409 BUILDING NAME: ENL BARRACKS W/AS

### ENERGY CALCULATION SUMMARY

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

FUNCTION .	<u>kW/yr</u> _	<u>kWh/yr</u>	<u>MBtu/yr</u> MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.73	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	1.73	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	1,291.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	62.10	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.0
TOTAL	63.84	1,291.50	0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	O	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**DATE**: 16-Sep-95

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

System Number: RAD-1

PREPARED BY: JM

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0409	BUILDING NAME:	ENL BARRACKS W/AS	
	Building UA:	5,245	CONDITIONED SQFT:	32,883

# SYTEM INFORMATION System Type: 27 System Name: Perimeter radiation valve

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	25%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED	: C	-    -
HTG HRS SAVED	. C	Ī
C/H HRS SAVED:	: C	ř

<u>ONSTANTS</u>	
HOAUHC:	C
HOAUH:	C
COAUHC:	(
COAUC:	0
нолонс:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	(
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	(
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM

BLDG: 0409 BUILDING NAME: ENL BARRACKS W/AS
ENERGY CALCULATION SUMMARY

System Type: 27

System Name: Perimeter radiation valve

System Number: RAD-1

FUNCTION	<u>kW/vr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.00	0.00	0.00

UMCS FUNCTI NO.		POINT <i>A</i> DO POINTS	AND COST AO POINTS	<b>DI</b>	RY AI POINTS	COST
25	Optimum start/stop - Perimeter Rad Valve; Night setback - Perimeter Rad Valve	0	1	0	1	\$456.00
	TOTAL:	0	1	0	1	\$456.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0409	BUILDING NAME:	ENL BARRACKS W/AS	
	Building UA:	5,245	CONDITIONED SQFT:	32,883

#### SYTEM INFORMATION

System Type: 21

System Name: HW Unit heater

System Number: UH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>inputs</u>	
Motor HP:	0.17
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	1,260
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	PRESENT
HR/YR	HR/YR
3,360	3,360
5,376	5,376
8,760	8,760
0	- I
0	- 
0	- !
	HR/YR : 3,360 : 5,376

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	. 0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

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BUILDING NAME: ENL BARRACKS W/AS

#### ENERGY CALCULATION SUMMARY

System Type: 21

System Name: iHW Unit heater

System Number: UH-1

<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
0.00	.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	7.93
0.00	0.00	7.93
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		0.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         .00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	DO POINT A	ND COS AO POINTS	T SUMMA DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:		<b>0</b>	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0409	BUILDING NAME:	ENL BARRACKS W/AS	
	Building UA:	5,245	CONDITIONED SQFT:	32,883

#### SYTEM INFORMATION

System Type: 21

System Name: HW Unit heater

System Number: UH-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of S		20		

#### SYSTEM OPERATING SCHEDULE

	,SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	1,270
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 3,360 3,360 HTG HRS ON: 5,376 5,376 H/C HRS ON: 8,760 8,760 CLG HRS SAVED: 0 HTG HRS SAVED: 0

0

C/H HRS SAVED:

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG:	0409	BUILDING NAME:	ENL BARRACKS W/AS
	ENER(	SY CALCULAT	ION SUMMARY
		(40 (12 m) 3 40 mm (1 m)	

System Type: 21

System Name: HW Unit heater

System Number: UH-2

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	, , , , , , , , , , , , , , , , , , ,
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	7.93	
Sub Total	0.00	0.00	7.93	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	0.00	7.93	. 0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	ND COS AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

### BUILDING 410 ENLISTED BARRACKS W/AS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0410	BUILDING NAME:	ENL BARRACKS W/AS	
	Building UA:	5,245	CONDITIONED SQFT:	32,883

#### SYTEM INFORMATION ....

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUIS	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	1,950
CFM-CLG:	1,950
%OA:	14%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON	3,360	3,360
HTG HRS ON	5,376	5,376
H/C HRS ON	8,760	8,760
CLG HRS SAVED	0	
HTG HRS SAVED	Ò	•
C/H HRS SAVED	0	•

<u>CONSTANTS</u>	
HOAUHC:	C
HOAUH:	C
COAUHC:	C
COAUC:	C
HOAOHC:	8.06
нолон:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0410

BUILDING NAME: ENL BARRACKS W/AS

#### ENERGY CALCULATION SUMMARY

System Type:

10

System Name:

Multizone air handling unit

System Number:

AHU-1

<u>FUNCTION</u>	<u>kWiyr</u>	kWh/yr	MBtu/yr MH/	<b>УГ</b> — — .
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	5.95	
Sub Total	1.76	0.00	5.95	
Economizer	0.00	1,725.28	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,528.84	11.83	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.0

UMCS FUNCTN NO.	UMCS APPLICATION	DO - POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0410	BUILDING NAME:	ENL BARRACKS W/AS

5,245

**Building UA:** 

CONDITIONED SQFT:

32,883

#### SYTEMINEORMATION :

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-2

#### TYPICAL BUILDING INFORMATION Occupancy Days: Occupancy HRS: Construction: Use: Catagory Number: M-F; SAT-SUN BARRACKS 0000-2400 6 SANDSTONE BLOCK Weeks of Winter: 32 20 Weeks of Summer:

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,375
CFM-CLG:	12,375
%OA:	14%
%Area:	29%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED	;	)
HTG HRS SAVED	: 0	)
C/H HRS SAVED	: 0	)

<u>ONSTANTS</u>	
HOAUHC:	
HOAUH:	
COAUHC:	
COAUC:	
НОАОНС:	8.0
нолон:	1
COAOHC:	0.00027
COAOC:	0.00072
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00026
ECHC:	0.00010
NSUCHC:	
NSUCC:	
DDCCHC:	0.000089
DDCCC:	0.00023
NSC:	1890
DDCH:	3760
OPT:	
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0410

BUILDING NAME: ENL BARRACKS W/AS

#### ENERGY CALCULATION SUMMARY

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-2

<u>FUNCTION</u>	<u>kWlyr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	10.99	0.00	0.00
Night Setback	0.00	0.00	28.75
Sub Total	10.99	0.00	28.75
Economizer	0.00	10,948.90	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	9,702.25	57.19
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			5.0

#### TYPICAL SYSTEM POINT AND COST SUMMARY UMCS COST **FUNCTN UMCS APPLICATION** DO AO DI ΑĪ **POINTS POINTS POINTS POINTS** NO. 1 0 0 \$348.00 18 Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU 29 Direct digital control - MZ AHU 0 7 0 8 \$3,378.00 33 Outside air damper ventilation and 0 1 0 0 \$272.00 recirculation control - AHU Outside air damper economizer 0 0 0 2 \$399.00 35 control - MZ AHU 0 0 0 \$112.00 Maintenance (filter) alarm - AHU 40 TOTAL: 11 \$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

32,883

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0410	BUILDING NAME:	ENL BARRACKS W/AS
	Building UA:	5,245	CONDITIONED SQFT:

#### SYTEM INFORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-3

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

SERVICE CONTRACTOR OF THE PROPERTY OF THE PROP	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,375
CFM-CLG:	12,375
%OA:	14%
%Area:	29%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	0

#### **HOURS CALCULATIONS** REQUIRED PRESENT HR/YR HR/YR 3,360 3,360 CLG HRS ON: 5,376 5,376 HTG HRS ON: 8,760 8,760 H/C HRS ON: CLG HRS SAVED: 0 0 HTG HRS SAVED: C/H HRS SAVED: 0

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
нолон:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM

BLDG: 0410 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-3

kW/vr	kWh/yr	MBtu/yr	<u>MH/yr</u>
0.00	.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
10.99	0.00	0.00	
0.00	0.00	28.75	
10.99	0.00	28.75	
0.00	10,948.90	0.00	
0.00	0.00	0.00	
0.00	9,702.25	57.19	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			5.
	0.00' 0.00 0.00 10.99 0.00 10.99 0.00 0.00 0.	0.00         .00           0.00         0.00           0.00         0.00           10.99         0.00           10.99         0.00           10.99         0.00           0.00         10,948.90           0.00         0.00           0.00         9,702.25           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         .00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           10.99         0.00         0.00           0.00         0.00         28.75           10.99         0.00         28.75           0.00         10,948.90         0.00           0.00         0.00         0.00           0.00         9,702.25         57.19           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO	AO POINTS	T SUMMA DI POINTS	AT POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

**DATE**: 09-Dec-95

PREPARED BY: JM

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0410	BUILDING NAME:	ENL BARRACKS W/AS	
	Building UA:	5,245	CONDITIONED SQFT:	32,883

#### SYTEM INFORMATION ....

System Type: 3 System Name: Small steam boiler System Number: BLR-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	K	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32			
Weeks of \$	Summer:	20	•		

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0.
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0.	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

0.0	Motor HP:
0.0	HP Effic:
0.8	Load Factor:
	CFM-HTG:
	CFM-CLG:
0%	%OA:
20%	%Area:
	CHILLER CAP (TONS):
0.0	KW-TON:
2,186,00	BLR CAP INPUT (BTUH):
1,749,00	BLR CAP OUTPUT (BTUH):

		PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	. 0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	. 0	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
нолон:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	O
CHWR:	17.5
CNWR:	C
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

**EMC NO:** 1406-001 **DATE:** 09-Dec-95

PREPARED BY: JM

BLDG: 0410 BUILDING NAME: ENL BARRACKS W/AS
ENERGY CALCULATION SUMMARY

System Type: 3
System Name: Small steam boiler

System Number: BLR-1

FUNCTION :	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/	AT.
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				4.0
Maintenance, Run Time, and Safety Alarms		ı		
TOTAL	0.00	0.00	0.00	4.0

UMÇS FUNCTI NO.		∵ ро	ND COST AO POINTS	DI ·	RY AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TOTAL:	1.1	0 *	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0410	BUILDING NAME:	ENL BARRACKS W/AS	
	Building UA:	5,245	CONDITIONED SQFT:	32,883
	·			
YIEN	INFORMATION	Trip.		
	System Type: 6			
	System Name: Small air	r cooled chiller		
	System Hame Onland	COOKE OF MICE		

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of	Summer:	20		

# SYSTEM OPERATING SCHEDULE

SEALOGUES SERVER SERVER F. COM ON PROPERTY.	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0		0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED	0	 }
HTG HRS SAVED	: C	·
C/H HRS SAVED	C	- )

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

0.00

4.00

PREPARED BY: JM

BLDG: 0410 BUILDING NAME: ENL BARRACKS W/AS

#### ENERGY CALCULATION SUMMARY

System Type: 6
System Name: Small air cooled chiller

System Number: CH-1

and Safety Alarms

FUNCTION -	<u>kWiyr</u>	kWh/yr	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.73	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	1.73	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	1,291.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	62.10	0.00	0.00
Remote Monitoring, Maintenance, Run Time,			4.00

1,291.50

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	O	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

63.84

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: JM

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0410	0410 BUILDING NAME: ENL BARRACKS W/AS		
1	Building UA:	5,245	CONDITIONED SQFT:	32,883
SYTEM	INFORMATION			
	System Type: 27	AND AND AND AND AND AND AND AND AND AND	x 3 m 2 y 2 m 2 m 2 m 2 m 2 m 2 m 2 m 2 m 2	от и применения в применения в применения в применения в применения в применения в применения в применения в п В применения в применения в применения в применения в применения в применения в применения в применения в приме

SYTEM INFORMATION		
System Type:	27	Ì
System Name:	Perimeter radiation valve	ì
System Number	RAD-1	1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	6'SANDSTONE BLOCK	<	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

	SUN:	MON:	TUE:	WFD:	THUR:	FRI:	SAT
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	:	)
HTG HRS SAVED	: C	)
C/H HRS SAVED:		)

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DA 1

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

**BLDG: 0410 BUILDING NAME:** ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 27

System Name: Perimeter radiation valve

System Number: RAD-1

<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/y</u>	<b>T</b>
0.00	.00	0.00	introduction (C.)
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         .00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         .00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTI NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT DO POINTS	AO	DI	RY AI POINTS	COST
25	Optimum start/stop - Perimeter Rad Valve; Night setback - Perimeter Rad Valve	0	1	0	1	\$456.00
	TOTAL:	0		0		\$456.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0410	BUILDING N	NAME: ENL BARRACKS W/AS	
	Building UA:	5,245	CONDITIONED SQFT:	32,883
YTEM	INFORMATION		ne service de la companya de la comp	
neria de la composición del composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la composición de la co	System Type:	21		
	System Name:	HW Unit heater		
	System Number:	UH-1		

TYPICAL BUILD	ING INFORMATI	ON:			
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLO	СК	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

SYSTEM OPERA	TING S	<u>CHEDU</u>	LE				
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	. 0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	0.16
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	1,260
CFM-CLG:	C
%OA:	0%
%Агеа:	8%
CHILLER CAP (TONS):	
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	C

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	3,360	3,360
HTG HRS ON	5,376	5,376
H/C HRS ON	8,760	8,760
CLG HRS SAVED	. 0	-
HTG HRS SAVED	. 0	
C/H HRS SAVED	: 0	•

HOAUHC:	(
HOAUH:	
COAUHC:	(
COAUC:	
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	
NSUCC:	(
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	(
CHWR:	17.5
CNWR:	(
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM

BLDG: 0410 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 21

System Name: HW Unit heater

System Number: UH-1

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	7.93
Sub Total	0.00	0.00	7.93
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			0.0
and Safety Alarms TOTAL	0.00	0.00	7,93

UMCS FUNCTI NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A DO - POINTS	ND COST AO POINTS	DI POINTS	<b>AI</b>	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:		0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

System Number: UH-2

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0410	BUILDING NAME:	ENL BARRACKS W/AS	
	Building UA:	5,245	CONDITIONED SQFT:	32,883

#### SYTEM INFORMATION

System 7	Type: 21	
System N	lame: HW Unit heater	

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	f Winter:	32		
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	1,270
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### **HOURS CALCULATIONS** REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 3,360 3,360 HTG HRS ON: 5,376 5,376 H/C HRS ON: 8,760 8,760 CLG HRS SAVED: 0 HTG HRS SAVED: 0 C/H HRS SAVED: 0

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	
CHWR:	17.5
CNWR:	
	U

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: JM

**DATE**: 16-Sep-95

BLDG: 0410 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 21
System Name: HW Unit heater

System Number: UH-2

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	<u>MBtwyr</u>	MHlyr
Schedule ST/SP	0.00	.00	0.00	C 2 Square Backeton (1980) (1980) (1980) (1980) (1980) (1980) (1980) (1980) (1980) (1980) (1980) (1980) (1980)
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	7.93	
Sub Total	0.00	0.00	7.93	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.0
TOTAL	0.00	0,00	7.93	, 0.0

UMCS FUNCTN	TYPICAL SYSTEI  UMCS APPLICATION	VI POINT A	ND COS	T SUMMA DI	RY AI	COST
NO.		POINTS	POINTS	POINTS	POINTS	
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

### BUILDING 411 ENLISTED BARRACKS W/AS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

### **ENERGY CALCULATION PARAMETERS**

BLDG:	BLDG: 0411		BUILDING NAME: ENL BARRACKS W			
	Building UA:	!	5,245		CONDITIONED SQFT:	32,883
SYTEM	INFORMATION					
	System Type:			12.00 July 20.00 S. 10.000		Andrew Commission of the Commi
	System Name:	Multizone ai	ir handling unit			
	System Number:	AHU-1				

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days
	6 SANDSTONE BLOCK	K	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32			
Weeks of	Summer:	20			

TTOOKS SI S								
SYSTEM OPERA	TING S	CHEDUL	<b>E</b>					
Submontron of the Side (1995) (1995) Submitted the Committee of the Commit	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:	
PRES START:	0	0	0	0	0	0	0	
PRES STOP:	24	24	24	24	24	24	24	
REQ START:	0	0	0	0	0	0	0	
REQ STOP:	24	_24	24	24	24	24	24	

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	1,950
CFM-CLG:	1,950
%OA:	14%
%Area:	11%
CHILLER CAP (TONS):	(
KW-TON:	0.00
BLR CAP INPUT (BTUH):	(
BLR CAP OUTPUT (BTUH):	

	REQUIRED HR/YR	PRESENT HR/YR	-
CLG HRS ON:	3,360	3	,360
HTG HRS ON:	5,370	5 5	,376
H/C HRS ON	8,76	0 8	,760
CLG HRS SAVED		Ö	
HTG HRS SAVED		0	
C/H HRS SAVED	:	Ö	

ONSTANTS	
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
нолон:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM

LOCATION: FT. RILEY, KS

BLDG: 0411

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type:

\_\_\_

10 Multizone air handling unit

System Number:

System Name:

AHU-1

<u>FUNCTION</u>	<u>kW/yr</u> —	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	0.00	10.90	
Sub Total	1.76	0.00	10.90	
Economizer	0.00	1,725.28	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,528.84	21.69	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.0
TOTAL	1.76	3,254.12	32.60	5.1

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTÁĽ:	1	8		11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #:** DACA 01-94-D-0033

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG:	0411			E	BUILDING	3 NAME:	ENL B	ARRACKS W/A	S	
	Buil	ding UA:		5,2	245		CON	DITIONED SQFT		32,883
SYTEM	INFORM	IATION								
***************************************	Syste	em Type: 1	0	, y , y , y , , , , , , , , , , , , , ,		100-100 (Common a 100 (Common a 100 (Co	····		- 6 c-666 c-600 (100 - 2008) 3	and the second of the contract of the second
	Syste	m Name: N	fultizone a	ir handlin	g unit					
	System	Number: A	HU-2					:		
FYPIC <i>E</i>	L BUILD	ING INF	ORMAT	ION :			•			
Catagory	Number:	Constru	ction:		Use:		- CALL BOOK	Occupancy HF	RS:	Occupancy Days:
		6 SANDS	TONE BLC	CK	BARRA	CKS		0000-2400		M-F; SAT-SUN
	Weeks o	f Winter:		32						
	Weeks of S	Summer:		20						
SYSTE	M OPER	ATING S	CHEDUI	E						
ida a sand Mod.		.SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:		
PRE	S START:	0	0	0	0	0	0	0		
PR	ES STOP:	24	24	24	24	24	24	24		
RE	Q START:	0	0	0	0	0	0	0		
RI	EQ STOP:	24	24	24	24	24	24 24			
INPUTS							CON	STANTS		
Motor HP:		V-1-40000 8	2.00		<u> </u>	НОА	UHC:	Description Control Control		
	HP Effic:			0.78		* *	НО	AUH:		
	Load	d Factor:			0.80		COAUHC		UHC:	
	Ci	FM-HTG:		3	3,565		N. 40 W. 11	СО	AUC:	
	CI	FM-CLG:		3	3,565			HOA	OHC:	8.0
		%OA:		-	14%			но	AOH:	1
		%Area:			8%		COAOHC:		OHC:	0.00027
СНІ	LLER CAP	(TONS):			0			CO	AOC:	0.00072
	K	(W-TON:			0.00			DC D	UTY:	0.1
BLR C	CAP INPUT	(BTUH):			0			DC DEM	AND:	0.1
BLR CA	P OUTPUT	(BTUH):			0				ECC:	0.00026
								E	CHC:	0.00010
								NSU	CHC:	

### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	. 0	-
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	•

0	HOAUH:
0	COAUHC:
0	COAUC:
8.06	HOAOHC:
13	НОАОН:
0.000274	COAOHC:
0.000725	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000267	ECC:
0.000101	ECHC:
0	NSUCHC:
0	NSUCC:
0.0000895	DDCCHC:
0.000237	DDCCC:
18900	NSC:
37600	DDCH:
0	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM

BLDG: 0411 BUILDING NAME: ENL BARRACKS W/AS

### ENERGY CALCULATION SUMMARY

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-2

000 0.00 0.00 0.00 0.00 0.00 3,154.17 0.00 2,795.03	0.00 0.00 0.00 7.93 7.93 0.00 0.00 15.78
0.00 0.00 0.00 0.00 3,154.17 0.00 2,795.03	0.00 0.00 7.93 7.93 0.00 0.00
0.00 0.00 0.00 3,154.17 0.00 2,795.03	0.00 7.93 7.93 0.00 0.00 15.78
0.00 0.00 3,154.17 0.00 2,795.03	7.93 7.93 0.00 0.00 15.78
0.00 3,154.17 0.00 2,795.03	7.93 0.00 0.00 15.78
3,154.17 0.00 2,795.03	0.00 0.00 15.78
0.00 2,795.03	0.00 15.78
2,795.03	15.78
0.00	
0.00	0.00
0.00	0.00
0.00	0.00
0.00	
	5.0 5.0
	0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

System Number: AHU-3

PREPARED BY: JM

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0411	BUILDING NA	AME:	ENL BARRACKS W/AS	
	Building UA:	5,245		CONDITIONED SQFT:	32,883
SYTEM	INFORMATION				
	System Type: 10		. 1845. a.s.2.		
	System Name: Multizone	e air handling unit			

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter: 3	<del>2</del> .		
Weeks of S	Summer: 2	0		

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: THUR: FRI: SAT: PRES START: 0 0 0 0 0 0 0 24 24 24 24 24 PRES STOP: 24 24 **REQ START:** 0 0 0 0 0 0 0

24

24

24

24

24

Motor HP:	3.00
MOLOI OF.	
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,115
CFM-CLG:	6,115
%OA:	14%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

24

**REQ STOP:** 

	REQUIRED HR/YR	PRESENT HR/YR
01.0.1100.011	<del></del>	
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	C	<u> </u>
HTG HRS SAVED:	C	)
C/H HRS SAVED:	C	)

HOUSECALCHIATIONS

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	ō
OAR:	5.67

24

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: JM

BLDG: 0411

BUILDING NAME: ENL BARRACKS W/AS

# ENERGY CALCULATION SUMMARY

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-3

FUNCTION :	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr   MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	4.62	0.00	0.00
Night Setback	0.00	0.00	15.86
Sub Total	4.62	0.00	15.86
Economizer	0.00	5,410.31	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	4,794.28	31.55
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			5.1

TYPICAL SYSTEM POINT AND COST SUMMARY							
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST	
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00	
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00	
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00	
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00	
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00	
	TOTAL:	1	8	1	11	\$4,509.00	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0411		BUILDING	NAME:	ENL BARRACKS W/AS	
	Building UA:		5,245		CONDITIONED SQFT:	32,883
					*	normalistic and an experience of the second section of the second
1/200	INCODULTION					
YTEM	INFORMATION					
YTEM	INFORMATION System Type:	10				
YTEM	System Type: System Name:		handling unit	<u>-</u>		

Catagory Number:	ING INFORMATION Construction:	Use:	Occupancy HRS:	Occupancy Days:
Jungery Herri	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of	Summer:	20		

SYSTEM OPERA	TING SO	CHEDUL	E				
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

	<u>INPUTS</u>
7.50	Motor HP:
0.83	HP Effic:
0.80	Load Factor:
15,075	CFM-HTG:
15,075	CFM-CLG:
14%	%OA:
24%	%Area:
0	CHILLER CAP (TONS):
0.00	KW-TON:
0	BLR CAP INPUT (BTUH):
0	BLR CAP OUTPUT (BTUH):

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	: 0	j.
HTG HRS SAVED		)
C/H HRS SAVED	;	)

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	. 0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	C
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM

BLDG: 0411 BUILDING NAME: ENL BARRACKS W/AS

# ENERGY CALCULATION SUMMARY

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-4

FUNCTION	<u>kW/yr</u> +	<u>kWhiyr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	10.99	0.00	0.00
Night Setback	0.00	0.00	23.79
Sub Total	10.99	0.00	23.79
Economizer	0.00	13,337.76	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	11,819.10	47.33
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			71.12

TYPICAL SYSTEM POINT AND COST SUMMARY							
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST	
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00	
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00	
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00	
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00	
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00	
	TOTAL:	1	8	1	41	\$4,509.00	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0411	BUILDING NAME:	ENL BARRACKS W/AS	
	Building UA:	5,245	CONDITIONED SQFT:	32,883

# SYTEMINFORMATION :

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLC	CK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0,	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>nputs</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,186,000
BLR CAP OUTPUT (BTUH):	1,749,000

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0:
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

**EMC NO**: 1406-001 **DATE**: 09-Dec-95

PREPARED BY: JM

BLDG: 0411 BUILDING NAME: ENL BARRACKS W/AS
ENERGY CALCULATION SUMMARY

System Type: 3
System Name: Small steam boiler

System Number: BLR-1

FUNCTION	kWiyr	kWh/yr	MBtulyr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring,			4.0
Maintenance, Run Time, and Safety Alarms			
TOTAL	0.00	0.00	0.00 4.0

UMCS FUNCTI NO.		TEM POINT AN DO POINTS I	ÃO	DI	RY AL POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	<b>TOT</b> /	AL: 1	0	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

DATE: 16-Sep-95
PREPARED BY: JM

**ENERGY CALCULATION PARAMETERS** 

BLDG: 04	.11	BUILDING NAME:	ENL BARRACKS W/AS	
	Building UA:	5,245	CONDITIONED SQFT:	32,883

# SYTEM INFORMATION System Type: 6 System Name: Small air cooled chiller

Catagory Number:	Construction:	ļ	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	İ	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	f Winter:	32	•		
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

System Number: CH-1

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	. 0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	74
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 3,360 3,360 HTG HRS ON: 5,376 5,376 8,760 H/C HRS ON: 8,760 CLG HRS SAVED: 0 HTG HRS SAVED: 0 C/H HRS SAVED: 0

CONSTANTS	
HOAUHC:	O
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	 
OAR:	5.67
OAN.	70.07

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0411

BUILDING NAME: ENL BARRACKS W/AS

6

ENERGY CALCULATION SUMMARY

System Type: System Name:

- 6

Small air cooled chiller

System Number:

CH-1

0.00		THE TAXABLE PARTY OF THE PARTY	
0.00,	.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
1.73	0.00	0.00	
0.00	0.00	0.00	
1.73	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	1,291.50	0.00	
0.00	0.00	0.00	
62.10	0.00	0.00	
			4.00
	0.00 1.73 0.00 1.73 0.00 0.00 0.00 0.00 0.00	0.00     0.00       1.73     0.00       0.00     0.00       1.73     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     1,291.50       0.00     0.00       62.10     0.00	0.00         0.00         0.00           1.73         0.00         0.00           0.00         0.00         0.00           1.73         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         1,291.50         0.00           0.00         0.00         0.00           62.10         0.00         0.00

MCS NCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG: 041	1		BUILDING NAME:	ENL BARRACKS W/AS	
	Building UA:		5,245	CONDITIONED SQFT:	32,883
SYTEM INF	ORMATION				T.
	System Type:	21			
S	System Name:	HW Unit heater		:	
Sys	stem Number:	UH-1			

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: THUR: FRI: SAT: PRES START: 0 0 0 0 0 0 24 24 24 PRES STOP: 24 24 24 24 0 0 0 0 REQ START: 0 0 REQ STOP: 24 24 24 24 24

<u>INPUTS</u>	
Motor HP:	0.17
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	1,260
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	- )
HTG HRS SAVED:	0	·
C/H HRS SAVED:	0	i i

HOAUHC:	0
HOAUH:	. 0
COAUHC:	
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS **EMC NO**: 1406-001 **DATE**: 16-Sep-95

PREPARED BY: JM

BLDG: 0411 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 21

System Name: HW Unit heater

System Number: UH-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>N</u>	tH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	7.93	
Sub Total	0.00	0.00	7.93	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AND COST  AO  POINTS	DI	RY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	O	1	2	\$1,213.00
	TOTAL:	1	0		2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

	BUILDING NAME:	ENL BARRACKS W/AS	
5	,245	CONDITIONED SQFT:	32,883
14 T	- Province State Control of the Cont		
	2 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	the state of the s	o material de l'Anna Carlo Carlo de material de la constitución de la constitución de la constitución de la co
Unit heater			
2			
RMATION			
on:	Use:	Occupancy HRS:	Occupancy Days:
NE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
N		E BLOCK BARRACKS	· · · · · · · · · · · · · · · · · · ·

# SYSTEM OPERATING SCHEDULE

Weeks of Summer:

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0.	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

20

<u>INPUTS</u>	
Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	1,270
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	- 
C/H HRS SAVED:	0	- !

, a 170 to 100	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0,000
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

						D 4 D D 4	OIZO 1	ALLAC
BLDG:	0411		BUILDIN	IG NAME:	ENL	BARRA	ICKS '	VV/AS
DLUG.	0411	 AND THE PROPERTY OF THE PROPER			AND THE RESERVED AND THE RESERVED AND THE RESERVED AND THE RESERVED AND THE RESERVED AND THE RESERVED AND THE	LICONOMINATION CONTRA		
Contract of the second		-u-n/	NAME	AIII AT	ION	CITAL	MAD	v
		ENERU			IUN	JUIN		
	Protection and the Control	THE RESIDENCE AND ADDRESS.	and the second of the second of the second		222 AMS 200	iii	:: man acut mount	ggs , ALARONOUS COOK
Below with the same of	Series and the series are series and the series and the series are series and the series are series and the series and the series are series and the series are series and the series are series and the series are seri							

System Type: 21
System Name: HW Unit heater
System Number: UH-2

FUNCTION 1	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	7.93
Sub Total	0.00	0.00	7.93
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			7.93

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	M POINT A  DO  POINTS	ND COS  AO POINTS	T SUMMA DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:		0	1	2	\$1,213.00

# BUILDING 500 POST HQ BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO:** 1406-001 **DATE:** 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

Building UA: 18,291 CONDITIONED SQFT: 65,453

#### SYTEM INFORMATION

System Type: 3
System Name: Small steam boiler
System Number: BLR-1

# TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE B	LOCK	ADMINISTRATION	0700-1700	M-F
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS	
Motor HP:	80.00
HP Effic:	0.91
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	4,250,000
BLR CAP OUTPUT (BTUH):	3,400,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	İ

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BUILDING NAME: POST HQ BLDG BLDG: 0500 ENERGY CALCULATION SUMMARY System Type: System Name: Small steam boiler System Number: BLR-1

FUNCTION	<u>kWiyr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	16,072.76	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	16,072.76	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	:		4.00
TOTAL	0.00	16,072.76	8.00 4.00

	TYPICAL	SYSTEM POINT	AND COS	ST SUMMA	ARY	
UMCS						COST
FUNCT NO.	N UMCS APPLICA	TION DO POINT	AO S POINTS	DI POINTS	AI POINTS	COST
280 778 7520					4	
7	Steam Boiler Monitoring	1	0	3	7	\$1,015.00
7	Steam Boiler Monitoring	TOTAL: 1	0	3	1 <del>1.00401.7742</del> 1	\$1,015.00 \$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

System Name: Pump System Number: CT-1 EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0500	BUILDING N	IAME: POST HQ BLDG	
Building UA:	18,291	CONDITIONED SQFT:	65,453
SYTEMINFORMATION			
System Type: 26	***************************************	144 0 A SANSON A CONTRACTOR - A CONT	

	Catagory Number: C	Construction:	Use:	Occupancy HRS:	Occupancy Day
4 SANDSTONE BEOCK ADMINIOTION 0700 1700		SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

# SYSTEM OPERATING SCHEDULE

700 feet 3 and 1990 feet from 10 and 10 and 10 and 10 and 10 and 10 and 10 and 10 and 10 and 10 and 10 and 10 a	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON	3,360	3,360
HTG HRS ON	5,376	5,376
H/C HRS ON	8,760	8,760
CLG HRS SAVED		-
HTG HRS SAVED	. C	)
C/H HRS SAVED	: C	)

HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 0500	BUILDING NAME:	
ENE	RGY CALCULAT	ION SUMMAR

System Type: 26
System Name: Pump
System Number: CT-1

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	1,115.34	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	1,115.34	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	1,115.34	0.00 3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	ND COST AO POINTS	DI	AI POINTS	COST
24	Scheduled start/stop control -	1	0	1	0	\$386.00
	Pump; Optimum start/stop - Pump;					
	Demand limiting - Pump					
	TOTAL:	101	0		0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0500	BUILDING NAME:	POST HQ BLDG	
	Building UA:	18,291	CONDITIONED SQFT:	65,453

#### SYTEM INFORMATION

System Type: 26
System Name: Pump
System Number: CT-2

TYPICAL BUILL Catagory Number:	Construction:	¥-,	Use:	Occupancy HRS:	Occupancy Days:
Catagory Humber.	4 SANDSTONE BLOCK		ADMINISTRATION	0700-1700	M-F
Weeks o	of Winter:	32			
Weeks of	Summer:	20			

# SYSTEM OPERATING SCHEDULE

SC State Personal State State Control of Control of State Control of Control	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	)
HTG HRS SAVED	0	)
C/H HRS SAVED:	0	)

<u>INSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
нолон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 0500		NAME: POST HQ BLDG	30 47 <u>825-7</u>
	ENERGY CALC	CULATION SUMMARY	
System Type:	26		
System Name:	Pump		
System Number:	CT-2		

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	1,115.34	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	1,115.34	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.00	1,115.34	3.

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	AO POINTS	T SUMMA  DI POINTS	RY AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	· 0	\$386.00
	TOTAL:	1	0	7	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0500	BUILDING NAME:	POST HQ BLDG
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Building UA: 18,291 CONDITIONED SQFT: 65,453

#### SYTEM INFORMATION

System Type: 22

System Name: Heat pump unit

System Number: HP-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE B	LOCK	ADMINISTRATION	0700-1700	M-F
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

# <u>INPUTS</u> <u>CONSTANTS</u>

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	6,960
CFM-CLG:	6,960
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### **HOURS CALCULATIONS**

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	-
HTG HRS SAVED:	3,776	•
C/H HRS SAVED:	6,153	

#### HOAUH: 44.6 COAUHC: 0 COAUC: 0 HOAOHC: 40.4 HOAOH: 65 COAOHC: 0.000877 COAOC: 0.00232 DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0.0000629 ECHC: 0.0000238 **NSUCHC:** 0.000609 NSUCC: 0.00161 DDCCHC: 0.000411 DDCCC: 0.00109

NSC:

OPT:

DDCH:

CHWR:

HOAUHC:

27.8

131000

43100

305

17.5

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 0500 BUILDING NAME: POST HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 22

System Name: Heat pump unit

System Number: HP-1

<u>kWiyr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
0.00	7,443.29	0.00	
0.00	368.97	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	26,079.75	383.38	
0.00	33,892.01	383.38	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			0.
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         7,443.29           0.00         368.97           0.00         0.00           0.00         0.00           0.00         26,079.75           0.00         33,892.01           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         7,443.29         0.00           0.00         368.97         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         26,079.75         383.38           0.00         33,892.01         383.38           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTI NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A DO POINTS	AO	T SUMMA  DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	. 0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0500	BUILDING NAME:	POST HQ BLDG	
	Building UA:	18.291	CONDITIONED SQFT:	65.453

#### SYTEM INFORMATION

System Type: 22

System Name: Heat pump unit

System Number: HP-2

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE B	LOCK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:	32			
Weeks of	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	. 0

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,300
CFM-CLG:	8,300
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON		3,360
HTG HRS ON	1,600	5,376
H/C HRS ON	2,607	8,760
CLG HRS SAVED	: 2,360	),
HTG HRS SAVED	3,776	
C/H HRS SAVED	: 6,153	}

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 0500 BUILDING NAME: POST HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 22

System Name: Heat pump unit

System Number: HP-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	7,443.29	0.00
Opt ST/SP	0.00	368.97	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	31,100.85	407.34
Sub Total	0.00	38,913.11	407.34
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			0. 407.34

UMCS FUNCTI	TYPICAL SYSTE  UMCS APPLICATION	M POINT A	AO	DI	AI .	COST
NO.		POINTS	POINTS	POINTS	POINTS	
20	Scheduled start/stop control -	1	0	1	2	\$1,213.00
	Unitary Equip; Optimum start/stop	-				
	Unitary Equip; Night setback -					
	Unitary Equip	No. 200 (100 (100 (100 (100 (100 (100 (100	A 56.00 57 98756 75478	Superior experience in anthrope fulfill and in 2005	a ngganga agan tings	
	TOTAL:	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

	BLDG:	0500	BUILDING NAME:	POST HQ BLDG	
1		Building UA:	18,291	CONDITIONED SQFT:	65,453

#### SYTEM INFORMATION

System Type:	22
System Name:	Heat pump unit
System Number:	HP-3

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: **4 SANDSTONE BLOCK** ADMINISTRATION 0700-1700 M-F Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	8,440
CFM-CLG:	8,440
%OA:	0%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	1,000	3,360
HTG HRS ON	1,600	5,376
H/C HRS ON	2,607	8,760
CLG HRS SAVED	2,360	)
HTG HRS SAVED	3,776	; ;
C/H HRS SAVED	6,153	Ĩ

<u>ONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
ноаон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 0500

BUILDING NAME: POST HQ BLDG

# ENERGY CALCULATION SUMMARY

System Type:

Heat pump unit

System Name: System Number:

HP-3

0.00	*		
0.00	13,944.40	0.00	
0.00	691.23	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	31,625.44	359.42	
0.00	46,261.07	359.42	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 31,625.44  0.00 46,261.07 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         0.00         0.00           0.00         0.00         0.00           0.00         31,625.44         359.42           0.00         46,261.07         359.42           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEN  UMCS APPLICATION	POINT A  DO  POINTS	AO POINTS	T SUMMA DI POINTS	RY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0		2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0500	BUILDING NAME:	POST HQ BLDG

Building UA: 18,291

CONDITIONED SQFT:

65,453

#### SYTEM INFORMATION

System Type: 22

System Name: Heat pump unit

System Number: HP-4

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Winter: 32
Weeks of Summer: 20

# SYSTEM OPERATING SCHEDULE

7.0300000000000000000000000000000000000	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	13,760
CFM-CLG:	13,760
%OA:	0%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR 3,360 CLG HRS ON: 1,000 5,376 HTG HRS ON: 1,600 8,760 2,607 H/C HRS ON: 2,360 CLG HRS SAVED: 3,776 HTG HRS SAVED: C/H HRS SAVED: 6,153

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
нолон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS **EMC NO**: 1406-001 **DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 0500 BUILDING NAME: POST HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 22
System Name: Heat pump unit

System Number: HP-4

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	22,500.15	0.00
0.00	1,115.34	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	51,559.96	431.30
0.00	75,175.46	431.30
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         22,500.15           0.00         1,115.34           0.00         0.00           0.00         0.00           0.00         51,559.96           0.00         75,175.46           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  POINTS	ND COS AO POINTS	T SUMMA DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

PREPARED BY: AJN/CWW

**DATE**: 16-Sep-95

**ENERGY CALCULATION PARAMETERS** 

BLDG:	0500	BUILDING NAME:	POST HQ BLDG

**Building UA:** 18,291 CONDITIONED SQFT:

65,453

SYTEM INFORMATION

System Type: 22

LOCATION: FT. RILEY, KS

System Name: Heat pump unit

System Number: HP-5

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	. 0	0	. 0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	. 0	7	7	7	7		0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	15,480
CFM-CLG:	15,480
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	-
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

<u>CONSTANTS</u>	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 0500 BUILDING NAME: POST HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 22

System Name: Heat pump unit

System Number: HP-5

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	22,500.15	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	58,004.95	479.22	
Sub Total	0.00	81,620.45	479.22	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.

UMCS FUNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	M POINT A  DO POINTS	ND COS  AO  POINTS	T SUMMA DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	3	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0500	BUILDING	NAME: POST HQ BLDG	
	Building UA:	18,291	CONDITIONED SQFT:	65,453
SYTEM	INFORMATION			
	System Type: 22			A 20 (400) (100) (

System Type: 22
System Name: Heat pump unit
System Number: HP-6

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F
Weeks o	f Winter:	32		
Weeks of S	Summer: 2	20		

# SYSTEM OPERATING SCHEDULE

A CONTRACT C	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

NPUTS	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	9,750
CFM-CLG:	9,750
%OA:	0%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	)
HTG HRS SAVED	3,776	5
C/H HRS SAVED:	6,153	3

CONSTANTS	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
НОАОН:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	C
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BUILDING NAME: POST HQ BLDG

# **ENERGY CALCULATION SUMMARY**

System Type: 22

BLDG: 0500

System Name: Heat pump unit

System Number: HP-6

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	13,944.40	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	. , , , , , , , , , , , , , , , , , , ,
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	36,534.13	335.46	
Sub Total	0.00	51,169.76	335.46	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.0
TOTAL	0.00	51,169.76	Sapril 2335.46	0.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	AO	SUMMA DI POINTS	RY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	O	1	· 2	\$1,213.00
	TOTAL		0	4		\$1 213 00

# BUILDING 509 ADMINISTRATION GENERAL PURPOSE

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0509	BUILDING NAME:	: ADMIN GEN PURPOSE	
	Building UA:	2,825	CONDITIONED SQFT:	10,108

# SYTEM INFORMATION

System Type: 22

System Name: Heat pump unit

System Number: HP-1

# TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
4	SANDSTONE BLOCK	ADMINISTRATION	0700-1700	M-F

Weeks of Winter: 32
Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7.	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	1.50			
HP Effic:	0.74			
Load Factor:	0.80			
CFM-HTG:	8,440			
CFM-CLG:	8,440			
%OA:	0%			
%Area:	100%			
CHILLER CAP (TONS):	0			
KW-TON:	0.00			
BLR CAP INPUT (BTUH):	0			
BLR CAP OUTPUT (BTUH):	0			

#### HOURS CALCULATIONS

	HR/YR	HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	
		-

ONSTANTS	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

BLDG: 0509

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE**: 16-Sep-95

PREPARED BY: JM

LOCATION: FT. RILEY, KS

BUILDING NAME: ADMIN GEN PURPOSE

# ENERGY CALCULATION SUMMARY

System Type: Heat pump unit System Name: HP-1 System Number:

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/	红
Schedule ST/SP	0.00	7,443.29	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	31,625.44	370.08	
Sub Total	0.00	39,437.70	370.08	
Economizer	0.00	0.00	0.00	
/entilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	ND COST AO POINTS	T SUMMA DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

# BUILDING 512 SENIOR ENLISTED QUARTERS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

PREPARED BY: JM

LOCATION: FT. RILEY, KS **ENERGY CALCULATION PARAMETERS** 

BLDG:	0512	BUILDING NAME:	SR ENL QTRS

BLDG:	0512	BUILDING NAME: SR ENL QTRS	

**Building UA:** 2,172 CONDITIONED SQFT:

13,619

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK		BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	. 0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	1,250
CFM-CLG:	1,250
%OA:	10%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR 3,360 CLG HRS ON: 3,360 5,376 HTG HRS ON: 5,376 8,760 H/C HRS ON: 8,760 0 CLG HRS SAVED: HTG HRS SAVED: 0 0 C/H HRS SAVED:

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67
CNWR:	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: JM

BLDG: 0512 BUILDING NAME: SR ENL QTRS

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

kWivr	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
4.62	0.00	0.00
0.00	0.00	3.28
4.62	0.00	3.28
0.00	1,105.95	0.00
0.00	0.00	0.00
0.00	980.02	6.53
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		3.
	0.00 0.00 0.00 4.62 0.00 4.62 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         .00           0.00         0.00           0.00         0.00           4.62         0.00           0.00         0.00           4.62         0.00           0.00         1,105.95           0.00         0.00           0.00         980.02           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0512	BUILDING NAME:	SR ENL QTRS

Building UA: 2,172 CONDITIONED SQFT: 13,619

#### EYTEM INFORMATION

System Type: 3
System Name: Small steam boiler
System Number: BLR-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE B	LOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	. 0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

#### **INPUTS** Motor HP: 0.33 HP Effic: 0.65 Load Factor: 0.80 CFM-HTG: 0 CFM-CLG: 0 %OA: 0% %Area: 0% CHILLER CAP (TONS): 0 KW-TON: 0.00 **BLR CAP INPUT (BTUH):** 1,611,000 **BLR CAP OUTPUT (BTUH):** 1,289,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	7  - 
HTG HRS SAVED:	0	1
C/H HRS SAVED:	0	

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0512 BUILDING NAME: SR ENL QTRS

System Type: 3
System Name: Small steam boiler
System Number: BLR-1

<u>FUNCTION</u>	<u>kWiyr</u> k	Wh/yr I	<u>//Btu/yr</u> Mi	<del>∜yr</del>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00

	TYPICAL SYSTE	M POINT AN	ND COS	TSUMMA	RY	
UMCS		DO.	AO	-DI	ΑĪ	COST
NO.			POINTS	7.7	POINTS	
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TOTAL:	7.7	0	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0512	BUILDING NAME:	SR ENL QTRS	
	Building UA:	2,172	CONDITIONED SQFT:	13,619

#### SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

# TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:
6 SANDSTONE BLOCK BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

The Control of the Co	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	. 0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

0

0

#### **INPUTS** 0.00 Motor HP: HP Effic: 0.64 0.80 Load Factor: CFM-HTG: 0 0 CFM-CLG: %OA: 0% 0% %Area: CHILLER CAP (TONS): 10 1.10 KW-TON:

#### **HOURS CALCULATIONS**

**BLR CAP INPUT (BTUH):** 

BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:		)
HTG HRS SAVED:		<b>)</b>
C/H HRS SAVED:	. (	)

#### **CONSTANTS** 0 HOAUHC: 0 HOAUH: COAUHC: 0 COAUC: 0 8.06 HOAOHC: 13 HOAOH: 0.000274 COAOHC: 0.000725 COAOC: DC DUTY: 0.17 DC DEMAND: 0.17 0.000267 ECC: 0.000101 ECHC: 0 **NSUCHC:** 0 **NSUCC:** DDCCHC: 0.0000895 0.000237 DDCCC: 18900 NSC: DDCH: 37600 OPT: 0 CHWR: 17.5 CNWR: 0 5.67 OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95 PREPARED BY: JM

BUILDING NAME: SR ENL QTRS BLDG: 0512 

ENERGY CALCULATION SUMMARY

System Type:

System Name: Air cooled DX compressor

System Number: CH-1

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	175.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	8.42	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	8.42	175.00	.000	3.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A DO POINTS	ND COS AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL		0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0512	<b>BUILDING NAME:</b>	SR ENL QTRS

**Building UA:** 2,172 CONDITIONED SQFT:

13,619

## SYTEM INFORMATION

System Type: 6

System Name: Small air cooled chiller

System Number: CH-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	. 0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0		0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR	
CLG HRS ON:	3,360	3,360	
HTG HRS ON:	5,376	5,376	
H/C HRS ON:	8,760	8,760	
CLG HRS SAVED:	0	)	
HTG HRS SAVED:	0	- 	
C/H HRS SAVED:	0		

UOLIDE CATOLICATIONS

<u>CONSTANTS</u>	*
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**EMC NO**: 1406-001 **DATE**: 16-Sep-95

CLIENT CNTRCT #: DACA 01-94-D-0033

PREPARED BY: JM

LOCATION: FT. RILEY, KS

BLDG: 0512 BUILDING NAME: SR ENL QTRS

# ENERGY CALCULATION SUMMARY

System Type: 6

System Name: Small air cooled chiller

System Number: CH-2

FUNCTION.	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.17	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	1.17	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	525.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	25.25	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			0,00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0512	BUILDING NAME:	SR ENL QTRS
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Building UA: 2,172

CONDITIONED SQFT:

13,619

## SYTEM INFORMATION

System Type: 5

System Name: Steam to hot water converter

System Number: CV-1

## TYPICAL BUILDING INFORMATION

Catagory Number	: Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F: SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	<u>0</u>	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,289,000
BLR CAP OUTPUT (BTUH):	1.289.000

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED	. 0	 }
HTG HRS SAVED		
C/H HRS SAVED:	. 0	- 

CONSTANTS				
(	HOAUHC:			
(	HOAUH:			
(	COAUHC:			
(	COAUC:			
8.06	HOAOHC:			
13	HOAOH:			
0.000274	COAOHC:			
0.000725	COAOC:			
0.17	DC DUTY:			
0.17	DC DEMAND:			
0.000267	ECC:			
0.000101	ECHC:			
(	NSUCHC:			
	NSUCC:			
0.0000895	DDCCHC:			
0.000237	DDCCC:			
18900	NSC:			
37600	DDCH:			
(	OPT:			
17.5	CHWR:			
	CNWR:			
5.67	OAR:			

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001 **DATE**: 16-Sep-95

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BUILDING NAME: SR ENL QTRS BLDG: 0512

# ENERGY CALCULATION SUMMARY

System Type: System Name: Steam to hot water converter CV-1 System Number:

FUNCTION	<u>kW/yr</u>	kWh/yr M	Btu/yr M	llyt 💮 📑
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	7.31	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0

JMCS JNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	ND COS AO POINTS	T SUMMA DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00

# BUILDING 540 OFFICERS QUARTERS MILIT

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

E

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

**DATE**: 16-Sep-95

**ENERGY CALCULATION PARAMETERS** 

BLDG:	0540	BUILD	DING NAME: OFF QTRS MILIT	
	Building UA:	3,238	CONDITIONED SQFT:	14,528
SYTEM	INFORMATION	Listua e e e e e e e e e e e e e e e e e e e	Application of the second seco	
**************************************		A STATE OF THE PARTY OF THE PAR	The state of the s	
	System Type:	` 1		
		Small hot water boiler		

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLO	СК	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	f Winter:	32			
Weeks of S	Summer:	20.			

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: FRI: SAT: \_\_\_\_\_0 PRES START: 0 0 0 0 0 24 24 PRES STOP: 24 24 24 24 0 **REQ START:** 0 0 0 0 0 0 24 24 24 24 24 24 REQ STOP: 24

<u>inputs</u>				
Motor HP:	0.25			
HP Effic:	0.65			
Load Factor:	0.80			
CFM-HTG:	0			
CFM-CLG:	0			
%OA:	0%			
%Area:	0%			
CHILLER CAP (TONS):	0			
KW-TON:	0.00			
BLR CAP INPUT (BTUH):	984,000			
BLR CAP OUTPUT (BTUH):	828,000			

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:		 )
HTG HRS SAVED:	C	)
C/H HRS SAVED:		 )

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

BLDG: 0540

BUILDING NAME: OFF QTRS MILIT

ENERGY CALCULATION SUMMARY

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

FUNCTION :	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr-
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	5.58	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.0
TOTAL	0.00	0.00	5.58	4.0

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	O	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95

PREPARED BY: JM/AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0540	BUILDING NAME:	OFF QTRS MILIT	
	Building UA:	3,238	CONDITIONED SQFT:	14,528

## SYTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-2

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
į	6 SANDSTONE BLOCK		BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32			
Weeks of S	Summer:	20	·		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	0.08
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	328,000
BLR CAP OUTPUT (BTUH):	276,000

# HOURS CALCULATIONS

	PRESENT HR/YR
3,360	3,360
5,376	5,376
8,760	8,760
0	
0	
0	•
	R/YR

<u>ONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN

BLDG: 0540 BUILDING NAME: OFF QTRS MILIT

# ENERGY CALCULATION SUMMARY

System Type: 1

System Name: Small hot water boiler

System Number: BLR-2

<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>	
0.00	.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	1.86	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			4.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         .00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         .00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         1.86           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEN  UMCS APPLICATION	DO POINT A	AO POINTS	T SUMMA  DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	Ō	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL	2	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

# **ENERGY CALCULATION PARAMETERS**

	BLDG:	0540	BUILDING NAME:	OFF QTRS MILIT	
į		Building UA:	3,238	CONDITIONED SQFT:	14,528

## SYTEM INFORMATION ...

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

#### TYPICAL BUILDING INFORMATION Occupancy Days: Catagory Number: Construction: Use: Occupancy HRS: 6 SANDSTONE BLOCK BARRACKS 0000-2400 M-F; SAT-SUN Weeks of Winter: 32 20

## SYSTEM OPERATING SCHEDULE

Weeks of Summer:

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	40
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

## **HOURS CALCULATIONS**

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:		
HTG HRS SAVED:	C	1
C/H HRS SAVED:	C	)

CONSTANTS	•
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0,000
CHWR:	17.5
CNWR:	17.5
OAR:	
UAK:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: JM/AJN

**DATE**: 16-Sep-95

BLDG: 0540 BUILDING NAME: OFF QTRS MILIT

ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

<u>FUNCTION</u>	<u>kWiyr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	700.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	33.66	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0

UMCS FUNCTN NO.	TYPICAL SYSTEN  UMCS APPLICATION	POINT A  DO POINTS	AND COS  AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	O	\$243.00
	TOTAL:		0		0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0540	BUILDING NAME:	OFF QTRS MILIT	
	Building UA:	3,238	CONDITIONED SQFT:	14,528

## SYTEM INFORMATION ===

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

## TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>inputs</u>	
Motor HP:	2.00
HP Effic:	0.71
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

## HOURS CALCULATIONS

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	: C	)
HTG HRS SAVED:	C	- )
C/H HRS SAVED:	. C	)

CONSTANTS	,
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

BLDG: 0540 BUILDING NAME: OFF QTRS MILIT

**ENERGY CALCULATION SUMMARY** 

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr	
0.00	.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
3.43	0.00	0.00	
0.00	0.00	0.00	
3.43	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.00
	0.00 0.00 0.00 3.43 0.00 3.43 0.00 0.00 0.00 0.00 0.00 0.00	0.00         .00           0.00         0.00           0.00         0.00           3.43         0.00           0.00         0.00           3.43         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         .00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           3.43         0.00         0.00           0.00         0.00         0.00           3.43         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMM <i>e</i> Di Points	RY AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	O	1	4	\$1,418.00
	TOTAL:	1	0	1	4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: JM/AJN

**DATE**: 16-Sep-95

# **ENERGY CALCULATION PARAMETERS**

Building UA: 3,238 CONDITIONED SQFT: 14,528

## SYTEM INFORMATION

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-2

## TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 6SANDSTONE BLOCK BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

0

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0

## HOURS CALCULATIONS

**BLR CAP OUTPUT (BTUH):** 

		PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	. 0	
HTG HRS SAVED	0	
C/H HRS SAVED:	0	•

<u>ONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0

OAR:

5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN

BLDG:	0540	BUILDING NAME:	OFF (	TRS MILIT	-

ENERGY CALCULATION SUMMARY

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-2

FUNCTION	<u>kW/yr</u> .	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	***************************************
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.12	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3,12	0.00	0.00	3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A DO POINTS	AO	T SUMMA  DI POINTS	RY AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
	TOTAL	1	• • •	1	4	\$1,418.00

# BUILDING 541 OFFICERS QUARTERS MILIT

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0541			В	JILDING	S NAME:	OFF Q	TRS MILIT		
Buil	ding UA:		3,93	3		CON	DITIONED SO	QFT:	18,083
YTEM INFORM	AATION								
ALTER TOWN TO THE PROPERTY OF THE PARTY OF T	em Type: 1								
	m Name: S		ater boiler				<del></del>		
	Number: B								
TYPICAL BUILD	ING INF	ORMAT	ION	_					
Catagory Number:	Constru	iction:		Use:	A 0.0 0.00.000 000 000 000 000 000 000 0	130 100 200 200 200 100 100 100 100 100 10	Occupancy	HRS:	Occupancy Days:
	6 SANDS	TONE BLC	CK	BARRA	CKS		0000-2400		M-F; SAT-SUN
Weeks o	of Winter:		32						
Weeks of	Summer:		20						
SYSTEM OPER	ATING S	CHEDUI	E						
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:		
PRES START:	0	0	0	0	0	0	0		
PRES STOP:	. 24	24	24	24	24	24	24		
REQ START:	0	0	0	0	0	0	0		
REQ STOP:	24	24	24	24	24	24	24		
NPUT <b>S</b>						CONS	STANTS		
tim of the supplemental of the second	lotor HP:	wernesses statistics of in-	0	.25			Н	OAUHC:	5-1-1- 3-1- 1-4-366 300- 5- 40-10-366 60-60 11- C
17	HP Effic:		0	.65				HOAUH:	(
	HP EMIC:								
	d Factor:		0	.80			С	OAUHC:	(
Loa C	d Factor: FM-HTG:		0	.80				COAUC:	
Loa C	d Factor: FM-HTG: FM-CLG:			0					8.06
Loa C	d Factor: FM-HTG:			0	-		Н	COAUC:	

0

0.00 984,000 828,000

D. D. O. S. D. I. I. I. I. I. I. I. I. I. I. I. I. I.	
BLR CAP INPUT (BTUH):	
BLR CAP OUTPUT (BTUH):	

HOURS CALCULATIONS

C/H HRS SAVED:

CHILLER CAP (TONS):

REQUIRED HR/YR	PRESENT HR/YR		
3,360	3,360		
5,376	5,376		
8,760	8,760		
	<u> </u>		
	· )		
	REQUIRED HR/YR : 3,360 : 5,376 : 8,760 : 0		

0

<del></del>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: JM

**DATE**: 16-Sep-95

BLDG: 0541 BUILDING NAME: OFF QTRS MILIT

ENERGY CALCULATION SUMMARY

System Type: 1
System Name: Small hot water boiler

System Name: Small not water boiler

System Number: BLR-1

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	5.58
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.0 7.58

	TYPICAL SYSTEM	POINT A	IND COS	TSUMM	ARY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2		\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0541		BUILDING NAME:	OFF QTRS MILIT	
	Building UA:		3,933	CONDITIONED SQFT:	18,083
YTEN	INFORMATION				
	System Type:		Company of the Second Company		
	Oystein type.	,			
	System Name: S		boiler	i	

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK		BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

# SYSTEM OPERATING SCHEDULE

ASSESSED OF THE PROPERTY OF TH	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	0.08
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Агеа:	0%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	328,000
BLD CAD OUTDUT (BTUH).	276 000

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	C	-
HTG HRS SAVED:	C	
C/H HRS SAVED:	C	-    -

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS PREPARED BY: JM

BLDG: 0541 BUILDING

BUILDING NAME: OFF QTRS MILIT

# **ENERGY CALCULATION SUMMARY**

System Type: 1
System Name: Small hot water boiler
System Number: BLR-2

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr	
0.00	.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	1.86	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			4.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         .00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         .00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         1.86           0.00         0.00         0.00           0.00         0.00         0.00

NCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control HW Boiler; Night setback - HW Boiler	2	0	0	O	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**EMC NO:** 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

Building UA: 3,933: CONDITIONED SQFT: 18,083

## SYTEM INFORMATION

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

# TYPIGAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 6 SANDSTONE BLOCK BARRACKS 0000-2400 M-F; SAT-SUN Weeks of Winter: 32 Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	40
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	C	- )
HTG HRS SAVED:	C	) I
C/H HRS SAVED:		· )

HOAUHC:	
HOAUH:	
COAUHC:	C
COAUC:	0
HOAOHC:	8.06
HOAOH:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO**: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0541

BUILDING NAME: OFF QTRS MILIT ENERGY CALCULATION SUMMARY

System Type: 6
System Name: Small air cooled chiller

System Number: CH-1

The state of the s		
0.00	.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	700.00	0.00
0.00	0.00	0.00
33.66	0.00	0.00
		0.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         700.00           0.00         0.00           33.66         0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95 PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0541	BUILDING NAME:	OFF QTRS MILIT	
	Building UA:	3,933	CONDITIONED SQFT:	18,083

## SYTEM INFORMATION

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK		BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	of Winter:	32			
Weeks of	Summer:	20			

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.71
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

REQUIRED HR/YR	PRESENT HR/YR
3,360	3,360
5,376	5,376
: 8,760	8,760
: 0	
: 0	
. 0	•
	REQUIRED HR/YR  : 3,360 : 5,376 : 8,760 : 0 : 0

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
НОАОНС:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	O
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM

BLDG: 0541 BUILDING NAME: OFF QTRS MILIT

ENERGY CALCULATION SUMMARY

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr !	VBtu/yr I	<u>AH/yr</u>
Schedule ST/SP.	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.43	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.43	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	3.43	0.00	30.00	3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	ND COST AO POINTS	SUMMA DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	. 4	\$1,418.00
	TOTAL:	1	0	1	4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

T CHIRCI #. DACA 01-94-D-0033

**DATE**: 16-Sep-95 **PREPARED BY**: JM

LOCATION: FT. RILEY, KS

System Number: DTWP-2

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0541	BUILDING NAME:	OFF QTRS MILIT	
Building UA:	3,933	CONDITIONED SQFT:	18,083
YTEM INFORMATION			
System Type: 24			
System Name: Dual tem	peratura water numa		

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	<	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	f Winter:	32	•		
Weeks of S	Summer:	20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	. 0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	i
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	ĺ

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

Y, KS PREPARED BY: JM

ENERGY CALCULATION SUMMARY

BUILDING NAME: OFF QTRS MILIT

System Type: 24

BLDG: 0541

System Name: Dual temperature water pump

System Number: DTWP-2

<u>kWiyr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>	
0.00	.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
3.12	0.00	0.00	
0.00	0.00	0.00	
3.12	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.00
	0.00 0.00 0.00 3.12 0.00 3.12 0.00 0.00 0.00 0.00 0.00 0.00	0.00         .00           0.00         0.00           0.00         0.00           3.12         0.00           0.00         0.00           3.12         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         .00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           3.12         0.00         0.00           0.00         0.00         0.00           3.12         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	ND COST AO — POINTS	C SUMMA DI POINTS	AI	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
	TOTAL:	4	0	1	4	\$1,418.00

# BUILDING 542 OFFICERS QUARTERS MILIT

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# ENERGY CALCUL ATION DARAMETERS

BLDG: 0542			В	UILDING	NAME:	OFF QT	RS MILI	T	
Buil	ding UA:		3,2	38	_	COND	DITIONED	SQFT:	14,528
SYTEM INFORM	ATION.								
Syste	m Type: 1	**************************************	7	1000 (10 000 00 00 00 00 00 00 00 00 00 00 00	Seed of American adversary	344CV C HINGSHOP			emiliar troff trums (1902) 101.4. And 1920 Alberta albeit and embrages
Syste	m Name: S	mall hot w	ater boiler	•					
System	Number: B	LR-1							
YPICAL BUILD	ING INF	ORMAT	ION -						
Catagory Number:	Constru	ction:		Use:			Occupa	ncy HRS:	Occupancy Days:
	6 SANDS	TONE BLO	CK	BARRA	CKS		0000-240	00	M-F; SAT-SUN
Weeks o	f Winter		32						
			32			*			
Weeks of			20			*			
Weeks of	Summer:	CHEDUI	20						
	Summer:	CHEDUI Mon:	20	WED:	THUR:	FRI:	SAT:		
	Summer: ATING S	Property Company	20 <b>E</b>	WED:	THUR:	FRI:	<b>SAT</b> : 0		
SYSTEM OPER	Summer: ATING S SUN:	MON:	20 <b>E</b> TUE:						
PRES START: PRES STOP: REQ START:	Summer: ATING S SUN: 0 24 0	MON: 0 24 0	20 TUE: 0 24	0 24 0	0 24 0	0 24 0	0 24 0		
PRES START: PRES STOP:	Summer:  ATING S SUN:  0 24	MON: 0 24	20 TUE: 0 24	0 24	0 24	0 24	0 24		
PRES START: PRES STOP: REQ START: REQ STOP:	Summer: ATING S SUN: 0 24 0	MON: 0 24 0	20 TUE: 0 24	0 24 0	0 24 0	0 24 0 24	0 24 0 24		
PRES START: PRES STOP: REQ START: REQ STOP:	Summer: ATING S SUN: 0 24 0	MON: 0 24 0	20 TUE: 0 24 0 24	0 24 0	0 24 0	0 24 0 24	0 24 0	HOAUHC:	
PRES START: PRES STOP: REQ START: REQ STOP:	Summer:  ATING S  SUN:  0  24  0  24	MON: 0 24 0	20 TUE: 0 24 0 24	0 24 0 24	0 24 0	0 24 0 24	0 24 0 24	Billiago, cumpanta massas entra a	
PRES START: PRES STOP: REQ START: REQ STOP:	Summer:  ATING S SUN:  0 24 0 24 10tor HP:	MON: 0 24 0	20 TUE: 0 24 0 24	0 24 0 24	0 24 0	0 24 0 24	0 24 0 24	HOAUHC:	

Motor HP:	0.25
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	984,000
BLR CAP OUTPUT (BTUH):	828,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED		, )
HTG HRS SAVED		)
C/H HRS SAVED:	: 0	, )

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	. 0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0542 BUILDING NAME: OFF QTRS MILIT

ENERGY CALCULATION SUMMARY

System Type:

System Name: Small hot water boiler

System Number: BLR-1

<u>FUNCTION</u>	<u>kW/yr</u>	- <u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	<u> </u>
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	5.58	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	5.58	4.00

UMCS	TYPICAL SYSTEM	POINT?	IND COS	i Sumivia	M.I	
UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0542	BUILDING NAME:	OFF QTRS MILIT	
	Building UA:	3,238	CONDITIONED SQFT:	14,528

## SYTEM INFORMATION ....

System Type: 1

System Name: Small hot water boiler

System Number: BLR-2

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK		BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	Winter:	32			
Weeks of S	Summer:	20	•		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	0.08
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	328,000
BLR CAP OUTPUT (BTUH):	276,000

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 3,360 3,360 HTG HRS ON: 5,376 5,376 H/C HRS ON: 8,760 8,760 CLG HRS SAVED: 0 HTG HRS SAVED: 0 C/H HRS SAVED: 0

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
нолон:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0542 BUILDING NAME: OFF QTRS MILIT

ENERGY CALCULATION SUMMARY

System Type: 1

System Name: Small hot water boiler

System Number: BLR-2

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtulyr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	1.86
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.00
TOTAL	0.00	0.00	4.00

UMCS FUNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	DO POINT A	AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0542	BUILDING NAME:	OFF QTRS MILIT	
	Building UA:	3,238	CONDITIONED SQFT:	14,528

## SYTEM INFORMATION ....

System Type: 8
System Name: Air cooled DX compressor
System Number: CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of	Summer:	20		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	40
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:		)
HTG HRS SAVED:	C	)
C/H HRS SAVED:	C	)

ONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

System Number:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO**: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

CH-1

PREPARED BY: JM

BLDG: 0542	BUILDING NAME: OFF QTRS MIL	LIT
	ENERGY CALCULATION SUMMA	ARY
Step 2 local of C. of the literature with White-		1
System Type:	18	
System Name:	Air cooled DX compressor	

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	700.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	33.66	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	POINT A  BO POINTS	AND COS AO POINTS	T SUMMA  DI POINTS	ARY	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0		0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #:** DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0542	BUILDING NAME:	OFF QTRS MILIT	
	Building UA:	3,238	CONDITIONED SQFT:	14,528

	SYTEM INFORMATION
	System Type: 24
	System Name: Dual temperature water pump
1	System Number: DTWP-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	6 SANDSTONE BLOCK	K	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	of Winter:	32			
Weeks of	Summer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	2.00
HP Effic:	0.71
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR		
CLG HRS ON:	3,360	3,360		
HTG HRS ON:	5,376	5,376		
H/C HRS ON:	8,760	8,760		
CLG HRS SAVED:	0	- 		
HTG HRS SAVED:	0	ı		
C/H HRS SAVED:	0	1		

CONSTANTS	Bir in Delikarderi, diber ist 🖖
HOAUHC:	0
HOAUH:	0
COAUHC:	. 0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0542 BUILDING NAME: OFF QTRS MILIT

ENERGY CALCULATION SUMMARY

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

FUNCTION .	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>	
Schedule ST/SP	0.00	.00	0.00	C-A-1-2
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.43	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	3.43	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
and Safety Alarms	3.43	0.00	0.00	-

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	AO	DI	RY AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
	TOTAL:	1	.0	1	4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0542	BUILDING NAME:	OFF QTRS MILIT	
	Building UA:	3,238	CONDITIONED SQFT:	14,528

#### SYTEM INFORMATION

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-2

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days
	6 SANDSTONE BLOCK		BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	C	- }
HTG HRS SAVED:	C	· )
C/H HRS SAVED:	C	j I
		-

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	8.06
НОАОН:	13
COAOHC:	0.000274
COAOC:	0.000725
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000267
ECHC:	0.000101
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000895
DDCCC:	0.000237
NSC:	18900
DDCH:	37600
OPT:	0
CHWR:	17.5
CNWR:	
OAR:	5.67
OAK.	3.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0542 BUILDING NAME: OFF QTRS MILIT

ENERGY CALCULATION SUMMARY

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-2

FUNCTION	<u>kWiyr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	3.12	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	3.12	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	3.12	0.00	0.00 / 3.

UMCS FUNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	POINT A  DO  POINTS	AO	T SUMMA DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
	TOTAL:	1	0	1	2	\$1,418.00

## BUILDING 602 DENTAL CLINIC

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0602	BUILDING NAME:	DENTAL CLINIC	
	Building UA:	1,060	CONDITIONED SQFT:	11,557

#### SYTEM INFORMATION ....

System Type: 18

System Name: Dual Duct air handling unit

System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	0 BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

## SYSTEM OPERATING SCHEDULE

408300004	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	25.00
HP Effic:	0.89
Load Factor:	0.80
CFM-HTG:	13,900
CFM-CLG:	13,900
%OA:	10%
%Area:	80%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		PRESENT IR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON	2,086	8,760
CLG HRS SAVED	2,560	
HTG HRS SAVED	4,096	
C/H HRS SAVED	6,674	

CONSTANTS	
HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
НОАОН:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BUILDING NAME: DENTAL CLINIC BLDG: 0602 

**ENERGY CALCULATION SUMMARY** 

18 System Type:

System Name: Dual Duct air handling unit

System Number: AHU-1

kW/yr	<u>kWh/yr</u>	<u>MBtu/yr</u>	MH/yr
0.00	122,612.89	465.72	
0.00	5,090.16	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	13,266.48	30.53	
0.00	140,969.52	496.25	
0.00	9,045.33	0.00	
0.00	512.98	21.28	
0.00	3,449.98	34.17	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			5.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         122,612.89           0.00         5,090.16           0.00         0.00           0.00         0.00           0.00         13,266.48           0.00         140,969.52           0.00         9,045.33           0.00         512.98           0.00         3,449.98           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         122,612.89         465.72           0.00         5,090.16         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         13,266.48         30.53           0.00         140,969.52         496.25           0.00         9,045.33         0.00           0.00         512.98         21.28           0.00         3,449.98         34.17           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

	TYPICAL SYSTEM	I POINT A	ND COS	TSUMMA	ARY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
28	Direct digital control - Dual Duct AHU	1	7	0	9	\$3,761.00
34	Outside air damper ventilation and recirculation control - Dual Duct AHU	0	1	0	0	\$272.00
37	Outside air damper economizer control - Dual Duct AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	3	8	1	13	\$5,241.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

DATE: 09-Dec-95
PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0602	BUILDING NAME:	DENTAL CLINIC

Building UA: 1,060 CONDITIONED SQFT: 11,557

#### SYTEM INFORMATION

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 10 BRICK AND CMU DENTAL CLINIC 0800-1700 M-F Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

NPUTS	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	607,200
BLR CAP OUTPUT (BTUH):	506,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760
CLG HRS SAVED:	2,560	
HTG HRS SAVED:	4,096	
C/H HRS SAVED:	6,674	

CONSTANTS	
HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 0602

BUILDING NAME: DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type:

System Name: Small steam boiler

System Number: BLR-1

FUNCTION	kW/yr	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	:		4.00
TOTAL	0.00	0.00	0.00 4.00

	TYPICAL	SYSTEM POINT	AND COS	T SUMM/	ARY 🔠	
UMCS	UMCS APPLICAT	TION DO	AO	DI	ΔĪ	COST
NO.		POINTS		POINTS	POINTS	
7	Ctarra Dailea Manitaria	1	Λ	2	1	\$1.015.00
7	Steam Boiler Monitoring	'	U	3	1	\$1,013.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

11,557

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0602	BUILDING NAME:	DENTAL CLINIC
	Building UA:	1,060	CONDITIONED SQFT:

#### SYTEMINFORMATION

System Type: 7

System Name: Large air cooled chiller

System Number: CH-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1	0 BRICK AND CMU		DENTAL CLINIC	0800-1700	M-F
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	. 9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	78
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		RESENT VYR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760
CLG HRS SAVED:	2,560	
HTG HRS SAVED:	4,096	
C/H HRS SAVED:	6.674	

<u>NSTANTS</u>	
HOAUHC:	50.2
HOAUH:	80.
COAUHC:	0.0012
COAUC:	0.0032
HOAOHC:	45.3
НОАОН:	72.8
COAOHC:	0.001
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 0602 BUILDING NAME: DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type: 7

System Name: Large air cooled chiller

System Number: CH-1

<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
0.00	3,917.46	0.00
0.00	466.73	0.00
0.00	0.00	0.00
1.17	0.00	0.00
0.00	0.00	0.00
1.17	4,384.18	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	1,368.50	0.00
0.00	0.00	0.00
65.81	0.00	0.00
	:	6.0
	0.00 0.00 0.00 1.17 0.00 1.17 0.00 0.00 0.00 0.00 0.00 0.00	0.00         3,917.46           0.00         466.73           0.00         0.00           1.17         0.00           0.00         0.00           1.17         4,384.18           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         1,368.50           0.00         0.00

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	ARY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
12	Chilled water reset - Large Air Cooled Chiller	0	0	0	4	\$1,133.00
16	Alarms - Chiller	0	0	2	0	\$281.00
43	Chiller demand limiting - Large Air Cooled Chiller	5	0	0	0	\$530.00
	TOTAL:	6	0	3	4	\$2,330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #:** DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

EMC NO: 1406-001

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0602	BUILDING	NAME: DENTAL CLINIC	
	Building UA:	1.060	CONDITIONED SQFT:	11.557

#### SYTEM INFORMATION .....

System Type: 5

System Name: Steam to hot water converter

System Number: CV-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1	0 BRICK AND CMU		DENTAL CLINIC	0800-1700	M-F
Weeks of	Winter:	32			
Weeks of S	iummer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.25
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	500,000
BLR CAP OUTPUT (BTUH):	500,000

	QUIRED PRE	<u>SENT</u> <u>(R</u>
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760
CLG HRS SAVED:	2,560	
HTG HRS SAVED:	4,096	
C/H HRS SAVED:	6,674	

HOAUHC:	50
HOAUH:	80
COAUHC:	0.001
COAUC:	0.00
HOAOHC:	45
НОАОН:	72
COAOHC:	0.00
COAOC:	0.00
DC DUTY:	0.
DC DEMAND:	0.
ECC:	0.00082
ECHC:	0.0003
NSUCHC:	0.0001
NSUCC:	0.0003
DDCCHC:	0.0001
DDCCC:	0.0003
NSC:	360
DDCH:	403
OPT:	3(
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BUILDING NAME: DENTAL CLINIC BLDG: 0602 **ENERGY CALCULATION SUMMARY** System Type: System Name: Steam to hot water converter System Number: CV-1

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtulyr MH/yr
Schedule ST/SP	0.00	940.19	0.00
Opt ST/SP	0.00	70.01	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	1,010.20	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	2.84
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	1,010.20	2.84 3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	A1 POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	O	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0602	BUILDING NAME:	DENTAL CLINIC	
	Building UA:	1,060	CONDITIONED SQFT:	11,557

#### SYTEM INFORMATION ....

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	0 BRICK AND CMU		DENTAL CLINIC	0800-1700	M-F
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	. 9	9	9	9	9	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.25
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		PRESENT HR/YR
CLG HRS ON:	800	3,360
HTG HRS ON:	1,280	5,376
H/C HRS ON:	2,086	8,760
CLG HRS SAVED:	2,560	
HTG HRS SAVED:	4,096	
C/H HRS SAVED:	6,674	

Control of the contro	/ 
<u>ONSTANTS</u>	
HOAUHC:	50
HOAUH:	80
COAUHC:	0.0012
COAUC:	0.003
HOAOHC:	45
НОАОН:	72
COAOHC:	0.001
COAOC:	0.004
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00082
ECHC:	0.00031
NSUCHC:	0.00014
NSUCC:	0.00037
DDCCHC:	0.00011
DDCCC:	0.00031
NSC:	3600
DDCH:	4030
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 0602 BUILDING NAME: DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	940.19	0.00
Opt ST/SP	0.00	70.01	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	1,010.20	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			<b>3.</b> C
TOTAL	0.00	1,010.20	0.00

UMCS	TYPICAL SYSTEM	POINT A	ND COST	SUMMA	RY	
FUNCTN NO.	UMCS APPLICATION	DO T POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
	TOTAL:	1	0	1	1	\$570.00

## BUILDING 610 ENLISTED BARRACKS W/AS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

System Number: CH-1

PREPARED BY

### **ENERGY CALCULATION PARAMETERS**

BLDG: 0610	BUILDING	NAME:	ENL BARRACKS W/AS	
Building UA:	8,369		CONDITIONED SQFT:	29,004
SYTEM INFORMATION				7.7
System Type: 7		S SCHOOL WEEK TOOL SERVICE	The second secon	SE 190 190 190 190 1 1 1 1 1 1 1 1 1 1 1 1
System Name: Large air	cooled chiller		:	

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

SYSTEM OPERA	TING SO	CHEDUL	E				
#SECULAR CARESTON SECULAR SECU	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0.	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	C
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	116
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	C

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	: 8,760	8,760
CLG HRS SAVED	: 0	<u>-</u> )
HTG HRS SAVED		)
C/H HRS SAVED		)

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	C
HOAOHC:	C
НОАОН:	C
COAOHC:	0
COAOC:	
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	(
ECHC:	(
NSUCHC:	(
NSUCC:	(
DDCCHC:	0.0000556
DDCCC:	0.00014
NSC:	20000
DDCH:	3390
OPT:	
CHWR:	17,
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO**: 1406-001 **DATE**: 16-Sep-95

-94-D-0033

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG:	0610	BUILDING NAME:	ENL BARRACKS W/AS
	ENE	RGY CALCULAT	ION SUMMARY

System Type: 7
System Name: Large air cooled chiller
System Number: CH-1

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
2.80	0.00	0.00
0.00	0.00	0.00
2.80	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	2,030.00	0.00
0.00	0.00	0.00
97.61	0.00	0.00
		6.C
	0.00 0.00 0.00 2.80 0.00 2.80 0.00 0.00 0.00 0.00 0.00 0.00	0.00         .00           0.00         0.00           0.00         0.00           0.00         0.00           2.80         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         2,030.00           0.00         0.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
12	Chilled water reset - Large Air Cooled Chiller	0	0	0	4	\$1,133.00
16	Alarms - Chiller	0	0	2	0	\$281.00
43	Chiller demand limiting - Large Air Cooled Chiller	5	0	0	0	\$530.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95 PREPARED BY:

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0610 BUILDING NAME: ENL BA	3ARRACKS W/AS
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8,369 **Building UA:** 

CONDITIONED SQFT:

29,004

SYTEM INFORMATION

System Type: 5

System Name: Steam to hot water converter

System Number: CV-1

TYPICAL BUILD	ING INFORMATIO	1.		i garage
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	f Winter:	32	•	
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	630,000
BLR CAP OUTPUT (BTUH):	630,000

	PRESENT HR/YR
3,360	3,360
5,376	5,376
8,760	8,760
0	- 
0	- 
0	
	3,360 5,376

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	
OAR:	5.67
OAR.	3.07

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY:

BLDG: 0610 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 5

System Name: Steam to hot water converter

System Number: CV-1

kW/yr	kWh/yr	MBtu/yr MH/yr
0.00	.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	3.57
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		3. 3. 3. 57 i.e. 3. 57
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         .00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMMA DI POINTS	ARY  AI  POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
	TOTAL:	1.1		1.1	3	\$1,495.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

## **ENERGY CALCULATION PARAMETERS**

BLDG: 0610	BUILDING NAM	IE: ENL BARRACKS W/AS	
Building	<b>UA:</b> 8,369	CONDITIONED SQFT:	29,004

#### SYTEM INFORMATION

System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-1

Catagory Number:	Construction:	Use	e:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BAF	RRACKS	0000-2400	M-F; SAT-SUN
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	10.00
HP Effic:	0.75
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# REQUIRED HR/YR PRESENT HR/YR CLG HRS ON: 3,360 3,360 HTG HRS ON: 5,376 5,376 H/C HRS ON: 8,760 8,760

OLO IIITO OIT.	5,500	0,000
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BUILDING NAME: ENL BARRACKS W/AS ENERGY CALCULATION SUMMARY

System Type: 24

BLDG: 0610

System Name: Dual temperature water pump

System Number: DTWP-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtulyr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	16.25	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	16.25	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO POINTS	T SUMM/ DI POINTS	ARY AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
	TOTAL:	1	0	1	7.4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 **DATE:** 16-Sep-95

PREPARED BY:

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0610	BUILDING NAME:	ENL BARRACKS W/AS

BLDG:	0610	BUILDING NAME:	ENL BARRACKS W/AS

8,369 **Building UA:** 

CONDITIONED SQFT:

29,004

#### SYTEM INFORMATION

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-2

#### TYPICAL BUILDING INFORMATION Occupancy HRS: Occupancy Days: Use: Construction: Catagory Number: M-F; SAT-SUN BARRACKS 0000-2400 5 BRICK AND CMU

Weeks of Winter: 32 20 Weeks of Summer:

#### SYSTEM OPERATING SCHEDULE

er gilgir i <b>mi</b> llionenin oli sillionin	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	Ö

	HR/YR	HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	. 0	- )
HTG HRS SAVED:		)
C/H HRS SAVED:	. C	)

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

**EMC NO**: 1406-001 **DATE**: 16-Sep-95

PREPARED BY:

BLDG: 0610 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-2

FUNCTION	kW/yr	<u>kWh/yr</u>	<u>MBtulyr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	14.19	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	14.19	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0 3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	POINT A  BO POINTS	AO POINTS	DI	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
	TOTAL		0	1.	4	\$1,418.00

## BUILDING 620 OFFICERS QUARTERS MILIT

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0620	BUILDING NAME:	OFF QTRS MILIT

Building UA:

4,410

CONDITIONED SQFT:

12,640

#### SYTEM INFORMATION

System Type: 5

System Name: Steam to hot water converter

System Number: CV-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU		BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

Willes of the second se	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	. 0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	398,800
BLR CAP OUTPUT (BTUH):	398,800

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON	5,376	5,376
H/C HRS ON	8,760	8,760
CLG HRS SAVED	: C	)
HTG HRS SAVED	. C	)
C/H HRS SAVED		)

<u>INSTANTS</u>	
HOAUHC:	
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 0620 BUILDING NAME: OFF QTRS MILIT

ENERGY CALCULATION SUMMARY

System Type: 5

System Name: Steam to hot water converter

System Number: CV-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	2.26
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	0.00	2.26

INCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00

## BUILDING 621 OFFICERS QUARTERS TRANS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0621
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3,741

BUILDING NAME: OFF QTRS TRANS

CONDITIONED SQFT:

10,723

#### SYTEM INFORMATION

System Type: 5

**Building UA:** 

System Name: Steam to hot water converter

System Number: CV-1

# TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f \A/intor.	20		

Weeks of Winter: 32 Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	21	17	0

## <u>INPUTS</u>

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	398,800
BLR CAP OUTPUT (BTUH):	398,800

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	-
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6.466	•

#### **CONSTANTS**

HOAUH:	
COAUHC:	
COAUC:	C
HOAOHC:	C
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOAUHC:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: AJN

BLDG: 0621

BUILDING NAME: OFF QTRS TRANS

## ENERGY CALCULATION SUMMARY

System Type: System Name:

Steam to hot water converter

CV-1 System Number:

FUNCTION	kW/vr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	4,800.21	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	4,800.21	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	2.26
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring,			3
Maintenance, Run Time, and Safety Alarms			2.26

MCS NCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00

## BUILDINGS 650 AND 652 COLD STORAGE FACILITIES

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0650	BUILDING NAME:	COLD STOR FAC

BLDG: 0650 BUILDING NAME: COLD STOR FAC

Building UA: 2,000

CONDITIONED SQFT: 22,331

#### STEM INCORMATION

System Type: 30

System Name: Cold Storage - Bldg 650

System Number: CH-1 - 4

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:	
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F	ì

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

#### NPUTS 0.00 Motor HP: 0.64 **HP Effic:** 0.80 Load Factor: CFM-HTG: 0 CFM-CLG: 0 0% %OA: 0% %Area: 0 **CHILLER CAP (TONS):** 0.00 KW-TON: **BLR CAP INPUT (BTUH):** 0 **BLR CAP OUTPUT (BTUH):** 0

#### Elours Galleu Avilons REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 3,360 3,360 HTG HRS ON: 5,376 5,376 H/C HRS ON: 8,760 8,760 CLG HRS SAVED: 0 HTG HRS SAVED: 0

0

C/H HRS SAVED:

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
нолонс:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0'
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 09-Dec-95

PREPARED BY: AJN/CWW

BLDG: 0650 BUILDING NAME: COLD STOR FAC

ENERGY CALCULATION SUMMARY

System Type: 30

System Name: Cold Storage - Bidg 650

System Number: CH-1 - 4

FUNCTION .	≟k₩ <u>lv</u> r	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			34.00
TOTAL	0.00	0.00	0.00 34.00

		TYPICAL S	YSTEM POINT AI	ND COST	SUMMA	.RY	
UMCS		APPLICATIO	N DO	ÃO -	DI	AI .	COST
FUNCIA NO.	) unico	AFFUCAIR			POINTS	POINTS	
45	Cold Storage	- Bldg 650	0	0	0	13	\$2,452.00
######################################	out the same of th						\$2,452.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 09-Dec-95

8,167

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

### **ENERGY CALCULATION PARAMETERS**

BLDG: 0652 BUILDING NAME: COLD STOR FAC

Building UA: 1,000 CONDITIONED SQFT:

#### SYTEM INFORMATION

System Type: 31

System Name: Cold Storage - Bldg 652

System Number: CH-1 - 4

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3	BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	.0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>NPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
НОАОНС:	0
нолон:	. 0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0-
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 0652 BUILDING NAME: COLD STOR FAC

ENERGY CALCULATION SUMMARY

System Type: 31

System Name: Cold Storage - Bldg 652

System Number: CH-1 - 4

FUNCTION	kW/yr	kWh/yr	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,			. 1	18.00
Maintenance, Run Time, and Safety Alarms				
TOTAL	0.00	0.00	0.00	18.00

UMCS FUNCTI NO.		TYPICAL S'	YSTEM POINT IN DO POINTS	AO	SUMMA DI POINTS	RY AI POINTS	COST
46	Cold Storage	- Bldg 652	0	0	0	5	\$979.00
		ŤC	TAL:	0	0	5	\$979.00

## BUILDING 710 TACTICAL EQUIPMENT SHOP

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0710	BUILDING NA	ME:	TAC EQUIP SHOP	
	Building UA:	1,462		CONDITIONED SQFT:	2,173

#### SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-1

TYPICAL BUILD	ING INFORMATIC	N			
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU		ADMINISTRATION	0600-1700	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	C
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	
BLR CAP OUTPUT (BTUH):	

	R/YR HR/	YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	

<u>ONSTANTS</u>	
HOAUHC:	C
HOAUH:	0
COAUHC:	C
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	C
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0710 BUILDING NAME: TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type: 8

**一点。** 

System Name: Air cooled DX compressor

System Number: ACCU-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	87.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	4.21	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3

UMCS FUNCTN NO.	TYPICAL SYSTEN  UMCS APPLICATION	DO POINTS	AO	T SUMMA DI POINTS	RY AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0710	BUILDING NAME:	TAC EQUIP SHOP	
	Building UA:	1,462	CONDITIONED SQFT:	2,173

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU		ADMINISTRATION	0600-1700	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0,	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

<u>nputs</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,000
CFM-CLG:	1,000
%OA:	22%
%Area:	19%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	_
HTG HRS SAVED:	3,456	•
C/H HRS SAVED:	5,631	

CONSTAI	VIS .	
	HOAUHC:	C
	HOAUH:	C
	COAUHC:	C
	COAUC:	C
	HOAOHC:	O
	HOAOH:	0
	COAOHC:	C
	COAOC:	C
	DC DUTY:	0.17
	DC DEMAND:	0.17
	ECC:	0
	ECHC:	0
	NSUCHC:	0.000176
	NSUCC:	0.000467
	DDCCHC:	0.000111
	DDCCC:	0.000294
	NSC:	10900
	DDCH:	32500
	OPT:	305
	CHWR:	17.5
	CNWR:	0
***************************************	OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 0710

BUILDING NAME: TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

<u>FUNCTION</u>	kW/yr	<u>kWb/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	2,546.09	0.00
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.92	0.00	0.00
Night Setback	0.00	991.13	3.03
Sub Total	0.92	3,675.12	3.03
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	347.27	9.03
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			
TOTAL	0.92	4,022.39	12.06

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0710	BUILDING NAME:	TAC EQUIP SHOP
	Building UA:	1,462	CONDITIONED SQFT:

**Building UA:** 

2,173 CONDITIONED SQFT:

SYTEM NEORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 3	2.		
Weeks of S	ummer: 2	Ö		

SYSTEM OPERATING SCHEDULE

**************************************	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	400,000
BLR CAP OUTPUT (BTUH):	320,000

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED	2,160	<u>,</u>
HTG HRS SAVED	3,456	<b>,</b>
C/H HRS SAVED	5,631	_

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0710 BUILDING NAME: TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	5,288.57	0.00	2.5 - 10 <u>2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 2.5 </u>
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	5,755.29	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.27	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.0
TOTAL	0.00	5,755.29	2.27	4.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

**Building UA:** 1,462

CONDITIONED SQFT: 2,173

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	4 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	. 0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

0.50

0

# INPUTS Motor HP:

HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,650
CFM-CLG:	1,650
%OA:	100%
%Area:	19%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0

#### HOURS CALCULATIONS

BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR	
CLG HRS ON	1,200	3,360	
HTG HRS ON	1,920	5,376	
H/C HRS ON	3,129	8,760	
CLG HRS SAVED	2,160		
HTG HRS SAVED	3,456	=	
C/H HRS SAVED	5,631	-	

#### CONSTANTS

CUNSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

BLDG: 0710

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BUILDING NAME: TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit

System Number: MAU-1

kW/vr	kWh/yr	MBtu/yr MH/yr
0.00	1,562.53	0.00
0.00	137.90	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	1,700.43	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	18.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
	1,700.43	3.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         1,562.53           0.00         137.90           0.00         0.00           0.00         0.00           0.00         0.00           0.00         1,700.43           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0710	BUILDING NAME:	TAC EQUIP SHOP
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Building UA:

1,462

CONDITIONED SQFT:

2,173.

#### SYTEM INFORMATION

System Type: 21

System Name: HW Unit heater

System Number: UH-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1:	3 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

\$200 to 100 to 100 to 100 to 100 to 100 to 100 to 100 to 100 to 100 to 100 to 100 to 100 to 100 to 100 to 100 to	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	. 0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

0

0

#### <u>INPUTS</u> 1.00 Motor HP: 0.69 **HP Effic:** 0.80 Load Factor: 3,260 CFM-HTG: CFM-CLG: 0 0% %OA: 62% %Area: 0 CHILLER CAP (TONS): KW-TON: 0.00

#### **HOURS CALCULATIONS**

BLR CAP INPUT (BTUH): BLR CAP OUTPUT (BTUH):

		PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED	2,160	
HTG HRS SAVED	3,456	•
C/H HRS SAVED	5,631	-

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

LOCATION: FT. RILEY, KS

BUILDING NAME: TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type:

BLDG: 0710

HW Unit heater System Name:

System Number: UH-1

FUNCTION	<u>kW/yr</u>	kWh/yr	<u>MBtu/yr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	2,980.55	0.00	graph company the debate of the contract of th
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	85.48	
Sub Total	0.00	3,243.59	85.48	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.0
TOTAL	0.00	3,243.59	85.48	•••••

UMCS FUNCTI NO.	TYPICAL SYSTEM  UMCS APPLICATION	M POINT A  DO POINTS	ND COS AO POINTS	T SUMMA DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	. 2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

# BUILDING 720 AF OPS BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0720	BUILDING N	BUILDING NAME: AF OPS BLDG				
Building UA:	1,587	CONDITIONED SQFT:	3,705			
SYTEM INFORMATION			£			
S			that were more assured to the probability of the pro-			

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	8 METAL PANEL AND CM	U SIMULATOR BLDG	0600-1600	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	. 0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	6	9	6	9	0
REQ STOP:	0	17	17	17	15	17	0

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	1,800
%OA:	0%
%Area:	33%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	•
C/H HRS SAVED:	6,466	-

<u>CONSTANTS</u>	
HOAUHC:	15.4
HOAUH:	- 24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
HOAOH:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: JM

BLDG: 0720 BUILDING NAME: AF OPS BLDG

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

<u>kWlyr</u>	<u>kWhiyr</u>	MBtu/yr MH/yr
0.00	2,923.29	0.00
0.00	157.34	0.00
0.00	0.00	0.00
0.92	0.00	0.00
0.00	3,700.97	47.51
0.92	6,781.60	47.51
0.00	1,160.45	0.00
0.00	0.00	0.00
0.00	503.83	21.56
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		3.0
	0.00 0.00 0.00 0.92 0.00 0.92 0.00 0.00 0.00 0.00 0.00	0.00         2,923.29           0.00         157.34           0.00         0.00           0.92         0.00           0.00         3,700.97           0.92         6,781.60           0.00         1,160.45           0.00         0.00           0.00         503.83           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: JM

#### **ENERGY CALCULATION PARAMETERS**

	BLDG:	0720	BUILDING NAME:	AF OPS BLDG
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Building UA: 1,587 CONDITIONED SQFT: 3,705

#### SYTEM INFORMATION:

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

# TYPIGAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 18 METAL PANEL AND CMU SIMULATOR BLDG 0600-1600 M-F Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	. 0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	6	9	6	9	0
REQ STOP:	0	17	17	17	15	17	0

	Charles , mass to consider the Con-
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	1,800
%OA:	10%
%Area:	33%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 880 3,360 5,376 HTG HRS ON: 1,408 2,294 8,760 H/C HRS ON: CLG HRS SAVED: 2,480 HTG HRS SAVED: 3,968 C/H HRS SAVED: 6,466

<u>CONSTANTS</u>	
HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
НОАОН:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0720

BUILDING NAME: AF OPS BLDG

#### **ENERGY CALCULATION SUMMARY**

System Type: :15

System Name: Small Single Zone air handling unit

System Number: AHU-2

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	3,266.62	17.92	
Opt ST/SP	0.00	157.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.92	0.00	0.00	
Night Setback	0.00	3,700.97	47.51	
Sub Total	0.92	7,124.93	65.43	
Economizer	0.00	1,160.45	0.00	
Ventilation/Recirculation	0.00	18.48	0.96	
DDC Control	0.00	503.83	21.56	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.92	8,807.68	87.96	3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

PREPARED BY: JM

**DATE:** 16-Sep-95

**ENERGY CALCULATION PARAMETERS** 

BLDG:	0720		BUILDING NA	ME:	AF OPS BLDG	
	Building UA:	:	1,587		CONDITIONED SQFT:	3,705
SYTEN	INFORMATION			4.5		
	System Type:	15				
		<u> </u>	e Zone air handling unit			
	System Number:		<u>-</u>			

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1	8 METAL PANEL	AND CMU	SIMULATOR BLDG	0600-1600	M-F
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

<u>System opera</u>	TING S	<u>CHEDUL</u>	Æ				
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	6	9	6	9	0
REQ STOP:	0	17	17	17	15	17	0

<u>INPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	1,800
%OA:	10%
%Area:	33%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR	
CLG HRS ON:	880	3,360	
HTG HRS ON:	1,408	5,376	
H/C HRS ON:	2,294	8,760	
CLG HRS SAVED:	2,480		
HTG HRS SAVED:	3,968	:	
C/H HRS SAVED:	6,466	-	

<u>CONSTANTS</u>	erani warazera in a k
HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.00029
COAUC:	0.000779
HOAOHC:	15.
HOAOH:	2
COAOHC:	0.00015
COAOC:	0.0004
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00074
ECHC:	0.00028
NSUCHC:	0.00031
NSUCC:	0.00084
DDCCHC:	0.00012
DDCCC:	0.00032
NSC:	8990
DDCH:	4080
OPT:	34
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

EMC NO: 1406-001

BUILDING NAME: AF OPS BLDG BLDG: 0720

ENERGY CALCULATION SUMMARY

System Type: Small Single Zone air handling unit System Name:

AHU-3 System Number:

FUNCTION	- kW/vr	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	3,266.62	17.92	
Opt ST/SP	0.00	157.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.92	0.00	0.00	
Night Setback	0.00	3,700.97	47.51	
Sub Total	0.92	7,124.93	65.43	
Economizer	0.00	1,160.45	0.00	
Ventilation/Recirculation	0.00	18.48	0.96	
DDC Control	0.00	503.83	21.56	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	_
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.
TOTAL	0.92	8,807.68	87.96	3.

	TYPICAL SYSTEM POINT AND COST SUMMARY					
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

#### **ENERGY CALCULATION PARAMETERS**

	BLDG:	0720	BUILDING NAME:	AF OPS BLDG
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**Building UA:** 1,587 CONDITIONED SQFT: 3,705

#### SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	8 METAL PANEL AND CMU	SIMULATOR BLDG	0600-1600	M-F

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	6	9	6	9	0
REQ STOP:	0	17	17	17	15	17	0

0

0

<u>inputs</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1 10

## HOURS CALCULATIONS

BLR CAP INPUT (BTUH):

BLR CAP OUTPUT (BTUH):

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON	880	3,360
HTG HRS ON	1,408	5,376
H/C HRS ON	2,294	8,760
CLG HRS SAVED	2,480	
HTG HRS SAVED	3,968	i e
C/H HRS SAVED	6,466	- }.

#### CONSTANTS

HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
НОАОН:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: JM

BLDG: 0720 BUILDING NAME: AF OPS BLDG

#### ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	4.21	87,50	0.00	3.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO	T SUMMA  DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: JM

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0720	BUILDING NAME:	AF OPS BLDG
	Building IIA:	1 587	CONDITIONED SOFT:

#### SYTEM INFORMATION .....

System Type: 8
System Name: Air cooled DX compressor

System Number: CH-2

# TYPICAL BUILDING INFORMATION

Catagory Number: Construction:

18 METAL PANEL AND CMU

Use: SIMULATOR BLDG Occupancy HRS: 0600-1600 Occupancy Days:

3,705

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0:	0	0	0	0	0
PRES STOP:	24	24	24	24		24	24
REQ START:	0	9	6	9	6.	9	0
REQ STOP:	0	17	17	17	15	17	0

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 880 3,360 HTG HRS ON: 1,408 5,376 H/C HRS ON: 2,294 8,760 CLG HRS SAVED: 2,480 HTG HRS SAVED: 3,968 C/H HRS SAVED: 6,466

CONSTANTS	
HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
нолон:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: JM

**DATE:** 16-Sep-95

BLDG: 0720

BUILDING NAME: AF OPS BLDG

# ENERGY CALCULATION SUMMARY

System Type:

Air cooled DX compressor System Name:

System Number: CH-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	87.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	4.21	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	4.21	87.50	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AND COS  AO POINTS	T SUMMA DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAE:		0		0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0720	BUILDING NAME:	AF OPS BLDG	
	Building UA:	1,587	CONDITIONED SQFT:	3,705

#### SYTEM INFORMATION:

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-3

#### TYPICAL BUILDING INFORMATION

Catagory Number	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	18 METAL PANEL AND CMU	SIMULATOR BLDG	0600-1600	M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	6	9	6	9	0
REQ STOP:	0	17	17	17	15	17	0

0

#### **INPUTS** Motor HP: 0.00 HP Effic: 0.64 Load Factor: 0.80 CFM-HTG: 0 0 CFM-CLG: 0% %OA: 0% %Area: CHILLER CAP (TONS): 5 KW-TON: 1.10

#### HOURS CALCULATIONS

**BLR CAP INPUT (BTUH):** 

BLR CAP OUTPUT (BTUH):

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	- !
HTG HRS SAVED	3,968	<del>-</del> i
C/H HRS SAVED:	6,466	

HOAUHC:	15.4
HOAUH:	24.
COAUHC:	0.00029
COAUC:	0.00077
HOAOHC:	15.
нолон:	2
COAOHC:	0.00015
COAOC:	0.0004
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00074
ECHC:	0.00028
NSUCHC:	0.00031
NSUCC:	0.00084
DDCCHC:	0.00012
DDCCC:	0.00032
NSC:	8990
DDCH:	4080
OPT:	34
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM

BLDG: 0720 BUILDING NAME: AF OPS BLDG

ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-3

FUNCTION 7	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	87.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	4.21	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.

UMCS FUNCTN	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	ND COS AO POINTS	T SUMMA  DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

## BUILDING 722 FLIGHT SIMULATOR

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0722	BUILDING NAME:	FLIGHT SIMULATOR	
	Building UA:	1,718	CONDITIONED SQFT:	7,000

#### SYTEM INFORMATION

System Type: 11

System Name: Variable Air Volume air handling unit

System Number: AHU-1

TYPICAL BUILD	NG INFORMATION		. 2. K. B	
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	8 METAL PANEL AND CM	U SIMULATOR BLDG	0600-1600	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	20.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	15,590
CFM-CLG:	15,590
%OA:	25%
%Area:	50%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED PRE IR/YR HR/	YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,37€
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

HOAIIIO:	1E A
HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
HOAOH:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.
CNWR:	
CIAAAL'	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0722 BUILDING NAME: FLIGHT SIMULATOR

ENERGY CALCULATION SUMMARY

System Type: 11

System Name: Variable Air Volume air handling unit

System Number: AHU-1

FUNCTION	<u>kWiyr</u>	<u>kWh/yr</u>	· <u>MBtu/yr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	90,434.71	369.30	
Opt ST/SP	0.00	4,714.79	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	30,503.53	77.22	
Sub Total	0.00	125,653.03	446.53	
Economizer	0.00	11,421.35	0.00	
Ventilation/Recirculation	0.00	400.12	20.89	
DDC Control	0.00	4,958.73	35.05	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.0

	TYPICAL SYSTEM	POINT A	ND COS	T SUMM/	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	cost
	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O O	0	1	\$348.00
32	Direct digital control - VAV AHU	0	3	0	11	\$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	4	1		\$4,826.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0722	BUILDING NAME	: FLIGHT SIMULATOR
		TO INCIDENT	. I FIGURE SHAPEN FOR

**Building UA:** 1,718 **CONDITIONED SQFT:** 7,000

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

#### PYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 18 METAL PANEL AND CMU SIMULATOR BLDG 0600-1600 M-F Weeks of Winter: Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	. 0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	7,500
CFM-CLG:	7,500
%OA:	20%
%Area:	30%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,000 3,360 HTG HRS ON: 1,600 5,376 H/C HRS ON: 2,607 8,760 CLG HRS SAVED: 2,360 HTG HRS SAVED: 3,776 C/H HRS SAVED: 6,153

<u>CONSTANTS</u>	
HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
HOAOH:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0722

BUILDING NAME: FLIGHT SIMULATOR

## ENERGY CALCULATION SUMMARY

System Type: 15

Small Single Zone air handling unit System Name:

AHU-2 System Number:

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	8,029.03	142.13	
Opt ST/SP	0.00	300.12	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	14,674.56	46.33	
Sub Total	0.00	23,003.72	188.47	
Economizer	0.00	5,494.55	0.00	
Ventilation/Recirculation	0.00	153.99	8.04	
DDC Control	0.00	2,385.54	21.03	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	31,037,80	217.53	3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC N

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0722 BUILDING NAME: FLIGHT SIMULATOR

Building UA: 1,718

CONDITIONED SQFT:

7,000

SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:

18 METAL PANEL AND CMU SIMULATOR BLDG 0600-1600 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

MON: FRI: SAT: WED: THUR: SUN: TUE: 0 0 0 PRES START: 0 0 0 24 24 24 24 24 24 PRES STOP: 24 0 6 6 6 **REQ START:** 0 6 6 16 16 16 0 0 16 16 **REQ STOP:** 

Motor HP:	10.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	4,050
CFM-CLG:	4,050
%OA:	25%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CALCULATIONS
--------------------

REQUIRED HR/YR	PRESENT HR/YR
1,000	3,360
1,600	5,376
2,607	8,760
: 2,360	
: 3,776	·
: 6,153	- -

<u>CONSTANTS</u>	
HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
НОАОН:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0722 BUILDING NAME: FLIGHT SIMULATOR

#### ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/y	I.
Schedule ST/SP	0.00	46,838.09	95.94	46143001303 315135 315
Opt ST/SP	0.00	2,545.18	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	7,924.26	30.89	
Sub Total	0.00	57,307.53	126.83	
Economizer	0.00	2,967.06	0.00	
Ventilation/Recirculation	0.00	103.94	5.43	
DDC Control	0.00	1,288.19	14.02	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

System Number: AHU-4

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

LOCATION: FT. RILEY, KS

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0722	BUILDING N	AME: FLIGHT SIMULATOR	
Building UA:	1,718	CONDITIONED SQFT:	7,000
YTEM INFORMATION			
System Type: 15			

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	18 METAL PANEL AN	D CMU	SIMULATOR BLDG	0600-1600	M-F
Weeks o	f Winter:	32	•		
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: THUR: SAT: 0 0 0 PRES START: 0 0 0 0 24 PRES STOP: 24 24 24 24 24 24 0 REQ START: 0 0 0 0 0 0 REQ STOP: 24 24 24 24 24 24

3.00	Motor HP:
0.79	HP Effic:
0.80	Load Factor:
(	CFM-HTG:
6,400	CFM-CLG:
0%	%OA:
0%	%Area:
(	CHILLER CAP (TONS):
0.00	KW-TON:
(	BLR CAP INPUT (BTUH):
(	BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON	5,376	5,376
H/C HRS ON	: 8,760	8,760
CLG HRS SAVED	: 0	
HTG HRS SAVED	: 0	= 
C/H HRS SAVED	: 0	- 

	<u>CONSTANTS</u>
15.4	HOAUHC:
24.8	HOAUH:
0.000295	COAUHC:
0.000779	COAUC:
15.5	HOAOHC:
25	HOAOH:
0.000155	COAOHC:
0.00041	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000743	ECC:
0.000281	ECHC:
0.000318	NSUCHC:
0.000842	NSUCC:
0.000122	DDCCHC:
0.000321	DDCCC:
89900	NSC:
40800	DDCH:
348	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0722 BUILDING NAME: FLIGHT SIMULATOR

#### **ENERGY CALCULATION SUMMARY**

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-4

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.00	0,00	0.00

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	(RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0722	BUIL	DING NAME:	FLIGHT SIMULATOR	
	Building UA:	1,718		CONDITIONED SQFT:	7,000
YTEM	INFORMATION				
	System Type:	1	2011 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	System Name:	Small hot water boiler		· 	
	System Number	RI R-1	· · · · · · · · · · · · · · · · · · ·		

Catagory Number:	Construction	on:	Use:	Occupancy HRS:	Occupancy Days
18	METAL PAI	NEL AND CMU	SIMULATOR BLDG	0600-1600	M-F
Weeks of	Winter:	32	•		
Weeks of S	ummer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT
PRES START:	0	0	0	0	0	0	C
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	C

<u>inputs</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	602,000
BLR CAP OUTPUT (BTUH):	480,100

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	•
C/H HRS SAVED:	5,892	

UOALUIO	
HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.00029
COAUC:	0.00077
HOAOHC:	15.
HOAOH:	2
COAOHC:	0.00015
COAOC:	0.0004
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00074
ECHC:	0.00028
NSUCHC:	0.00031
NSUCC:	0.00084
DDCCHC:	0.00012
DDCCC:	0.00032
NSC:	8990
DDCH:	4080
OPT:	34
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0722 BUILDING NAME: FLIGHT SIMULATOR **17.00** 3.00

#### ENERGY CALCULATION SUMMARY

System Type:

Small hot water boiler System Name:

System Number: BLR-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>M</u>	<u>H/yr</u>
Schedule ST/SP	0.00	8,195.05	0.00	
Opt ST/SP	0.00	788.68	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	8,983.73	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	3.41	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			!	4.0
TOTAL	0.00	8,983.73	3.41	4.0

UMCS UNCTN NO:	TYPICAL SYSTEN  UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

ı	BLDG:	0722	BUILDING NAME	: FLIGHT SIMULATOR	
		Building UA:	1,718	CONDITIONED SQFT:	7,000

SYTEM INFORMATION
System Type: 6
System Name: Small air cooled chiller
System Number: CH-1

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Occupancy HRS: Occupancy Days: 18 METAL PANEL AND CMU SIMULATOR BLDG 0600-1600 M-F Weeks of Winter: Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

<u>NPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	70
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	-
C/H HRS SAVED:	6,153	-

CONSTANTS	
HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
НОАОН:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0722 BUILDING NAME: FLIGHT SIMULATOR

ENERGY CALCULATION SUMMARY

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
0.00	8,630.20	0.00
0.00	1,272.59	0.00
0.00	0.00	0.00
2.80	0.00	0.00
0.00	0.00	0.00
2.80	9,902.78	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00.	0.00
0.00	0.00	0.00
0.00	1,225.00	0.00
0.00	0.00	0.00
58.91	0.00	0.00
		4.00
	0.00 0.00 0.00 2.80 0.00 2.80 0.00 0.00 0.00 0.00 0.00	0.00         8,630.20           0.00         1,272.59           0.00         0.00           2.80         0.00           0.00         0.00           2.80         9,902.78           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         1,225.00           0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AND COS  AO  POINTS	T SUMMA  DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
	TOTAL	2	0		2	\$1,481.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

**DATE:** 16-Sep-95

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0722	BUILDING NAME:	FLIGHT SIMULATOR	
	Building UA:	1,718	CONDITIONED SQFT:	7,000

#### SYTEM INFORMATION System Type: 6 System Name: Small air cooled chiller System Number: CH-2

Catagory Number: Construction:	Us	e:	Occupancy HRS:	Occupancy Days:
18 METAL PANEL AND CI	MU SIN	MULATOR BLDG	0600-1600	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	(
CFM-CLG:	(
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	16
KW-TON:	1.10
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	C

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	: O	· )
HTG HRS SAVED		- )
C/H HRS SAVED:	. 0	

<u>NSTANTS</u>	Social Carry
HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.00029
COAUC:	0.00077
HOAOHC:	15.
НОАОН:	2:
COAOHC:	0.00015
COAOC:	0.0004
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00074
ECHC:	0.00028
NSUCHC:	0.00031
NSUCC:	0.000842
DDCCHC:	0.00012
DDCCC:	0.00032
NSC:	8990
DDCH:	4080
OPT:	34
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 0722 BUILDING NAME: FLIGHT SIMULATOR

**ENERGY CALCULATION SUMMARY** 

System Type: 6
System Name: Small air cooled chiller

System Number: CH-2

FUNCTION .	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.0
TOTAL	0.00	0.00	0.00	4.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

# BUILDING 723 MAINTENANCE HANGAR COMB

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 09-Dec-95

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0723

BUILDING NAME: MNT HANGAR COMB

Building UA: 9,771

CONDITIONED SQFT: 21,640

SYTEM INFORMATION

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:

13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

THUR: SAT: FRI: MON: TUE: WED: SUN: 0 0 0 0 0 0 PRES START: 0 24 24 24 24 24 24 PRES STOP: 24 0 **REQ START:** 0 7 7 7 7 17 17 0 0 17 17 17 **REQ STOP:** 

<u>nputs</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	90%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	3,254,000
BLR CAP OUTPUT (BTUH):	2,603,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	]
HTG HRS SAVED:	3,776	į
C/H HRS SAVED:	6,153	ĺ

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0723

BUILDING NAME: MNT HANGAR COMB

# ENERGY CALCULATION SUMMARY

System Type: 3
System Name: Small steam boiler

System Number: BLR-1

<u>FUNCTION</u>	. KW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:		4.0
TOTAL	0.00	0.00	0.00	4.0

	TYPICAL SY	STEM POINT AN	ND COST	SUMMA	RY	
UMCS	N UMCS APPLICATION	DO.	AO	DI	ΑĪ	COST
NO.	and the second s		POINTS _		POINTS	
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	<b>70</b> 1	FAL: 1	0	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0723	BUILDING NAME:	MNT HANGAR COMB

CONDITIONED SQFT: **Building UA:** 9,771

21,640

#### SYTEM INFORMATION

System Type: 5

System Name: Steam to hot water converter

System Number: CV-1

#### TYPICAL BUILDING INFORMATION

Occupancy HRS: Occupancy Days: Construction: Catagory Number: M-F 13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800

32 Weeks of Winter: Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

9928.2.m 120.00000, 100.000000000000000000000000000	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

832,960

<u>NPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	832,960

#### HOURS CALCULATIONS

BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON	2,607	8,760
CLG HRS SAVED	2,360	- )
HTG HRS SAVED	3,776	5
C/H HRS SAVED	6,153	3

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001 DATE: 16-Sep-95

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 10-36

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0723

BUILDING NAME: MNT HANGAR COMB

# ENERGY CALCULATION SUMMARY

System Type:

System Name: Steam to hot water converter

System Number: CV-

<u>FUNCTION</u>	<u>kWiyr</u> l	:Wh/yr M	Btu/yr MH/	yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	4.72	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	. 0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	4.72	3.00

MCS NCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	O	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0723	BUILDING NAME:	MNT HANGAR COMB	
	Building UA:	9,771	CONDITIONED SQFT:	21,640

# SYTEM INFORMATION

System Type: 16	
System Name: Heating and Ventilating Unit	1
System Number: H\/-1	

TYPICAL BUILDI	NG INFORMATION			
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of Su	ummer: 20	•		

# SYSTEM OPERATING SCHEDULE

	'SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>			
Motor HP:	0.25		
HP Effic:	0.65		
Load Factor:	0.80		
CFM-HTG:	1,600		
CFM-CLG:	0		
%OA:	100%		
%Area:	10%		
CHILLER CAP (TONS):	0		
KW-TON:	0.00		
BLR CAP INPUT (BTUH):	0		
BLR CAP OUTPUT (BTUH):	Ö		

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,00	0 3,360
HTG HRS ON:	1,60	0 5,376
H/C HRS ON:	2,60	7 8,760
CLG HRS SAVED:	2,36	0
HTG HRS SAVED:	3,77	6
C/H HRS SAVED:	6,15	<del></del>

<u>ONSTANTS</u>	
HOAUHC:	
HOAUH:	
COAUHC:	
COAUC:	
HOAOHC:	
НОАОН:	
COAOHC:	
COAOC:	
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	
ECHC:	
NSUCHC:	0.00010
NSUCC:	0.00027
DDCCHC:	0.00016
DDCCC:	0.00042
NSC:	9430
DDCH:	4060
OPT:	30
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0723 BUILDING NAME: MNT HANGAR COMB

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	866.74	0.00	
Opt ST/SP	0.00	70.01	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	92.14	
Sub Total	0.00	936.75	92.14	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	39.67	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:	1	3.00
TOTAL	0.00	936.75	131.81	3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

### **ENERGY CALCULATION PARAMETERS**

THUR:

17

0

17

FRI:

0

SAT:

0

BLDG: 0723	BUILDING NAME:	MNT HANGAR COMB
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**Building UA:** 9,771 CONDITIONED SQFT:

21,640

#### SYTEM INFORMATION.

**REQ STOP:** 

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

## TYPICAL BUILDING INFORMATION

Catagory Number: Construction: 13 METAL PANEL AND CMU VEH MAINT SHOP

Occupancy HRS: 0700-1800

Occupancy Days: M-F

Weeks of Winter: Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

#### SUN: MON: TUE: WED: PRES START: 0 0 0 0

PRES STOP: 24 24 24 24 24 24 24 7 7 7 7 0 0 **REQ START:** 

**INPUTS** 

0

1.00
0.66
0.80
0
0
0%
32%
0
0.00
0

#### HOURS CALCULATIONS

BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED	2,360	)
HTG HRS SAVED:	3,776	- i
C/H HRS SAVED:	6,153	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95 LOCATION: FT. RILEY, KS PREPARED BY: JM

BLDG: 0723 **BUILDING NAME: MNT HANGAR COMB** 

ENERGY CALCULATION SUMMARY

25 System Type:

System Name: Hot water radiation pump

System Number: RAD-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	3,414.42	0.00	2000 CONTRACTOR OF THE CONTRAC
Opt ST/SP	0.00	275.79	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	3,690.21	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0

	TYPICAL SYSTEM	A POINT A	ND COS	T SUMMA	RY	•
UMCS FUNCTI	UMCS APPLICATION	DO	AO	DI.	ΑĬ	COST
NO.		POINTS		POINTS	POINTS	
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW	1	0	1	1	\$570.00
	Pump; Night setback - HW Pump					
	TOTAL	1	0	- <b>1</b>		\$570.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0723	BUILDING NAME:	MNT HANGAR COMB	
	Building UA:	9,771,	CONDITIONED SQFT:	21,640

#### SYTEM INFORMATION

		Туре:	27
Svs	stem l	Name:	Perimeter radiation valve

System Number: RAD-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of V	Vinter: 3	$\overline{2}$		
Weeks of Su	mmer: 2	D		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	. 0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	25%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,000 3,360 5,376 HTG HRS ON: 1,600 H/C HRS ON: 2,607 8,760 CLG HRS SAVED: 2,360

3,776

6,153

HOURS CALCULATIONS

HTG HRS SAVED:

C/H HRS SAVED:

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	. 0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM

BLDG: 0723 BUILDING NAME: MNT HANGAR COMB

ENERGY CALCULATION SUMMARY

System Type: 27
System Name: Perimeter radiation valve

System Number: RAD-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A	AO POINTS	T SUMMA  DI POINTS	RY At POINTS	COST
25	Optimum start/stop - Perimeter Rad Valve; Night setback - Perimeter Rad Valve	0	1	0	1	\$456.00
	TOTAL:	0	1	0	<b>.</b>	\$456.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

System Number: UH-1

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0723	BUILDING N	AME: MNT HANGAR COMB	
	Building UA:	9,771	CONDITIONED SQFT:	21,640
SYTEM	INFORMATION			
	System Type: 21			
	System Name: HW Unit	heater		

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:	
13 METAL PANEL AND CMU		VEH MAINT SHOP	0700-1800	M-F	
Weeks of	Winter: 32				
Weeks of S	ummer: 20				

SYSTEM OPERA	TING S	CHEDUI	E				
**************************************	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	. 0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.25
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	740
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED	2,360	<del>-</del>
HTG HRS SAVED	3,776	; ;
C/H HRS SAVED:	6,153	5

<u>ONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0723 BUILDING NAME: MNT HANGAR COMB

ENERGY CALCULATION SUMMARY

System Type: 21
System Name: HW Unit heater

System Number: UH-1

FUNCTION	<u>kW/yr </u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	866.74	0.00	Stapen Latin Steel Revenue 1981 Latin
Opt ST/SP	0.00	70.01	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	73.71	
Sub Total	0.00	936.75	73.71	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.0
TOTAL	0.00	936.75	73.71	0.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMM/ DI POINTS	ARY  AI  POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95 LOCATION: FT. RILEY, KS PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0723	BUILDING NAME	: MNT HANGAR COMB	
	Building UA:	9,771	CONDITIONED SQFT:	21,640

# SYTEM INFORMATION

Suntam Tuna 21	
System Type: 21	
System Name: HW Unit heater	
System Number: UH-2	

Catagory Number: Construction:		Use:	Occupancy HRS:	Occupancy Days:
13 METAL PANEL AND	CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of Winter:	32			
Weeks of Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0.	7	7	7	7	7	0
REQ STOP:	0	17.	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.25
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	740
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	!
HTG HRS SAVED:	3,776	pi.
C/H HRS SAVED:	6,153	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0723	BUILDING NAME:	MNT HANGAR COMB
BLDG. VIZS		
ENEC	TA IIIO IAO VOI	TON CHIMMARY
ENER	(GI CALCULA)	ION COMMUNITY
	DESCRIPTION AND STREET, NAME AND STREET,	

System Type: 21
System Name: HW Unit heater
System Number: UH-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	866.74	0.00
Opt ST/SP	0.00	70.01	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	73.71
Sub Total	0.00	936.75	73.71
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time,			73.71
and Safety Alarms TOTAL	0.00	936.75	73.71

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	r Summa Di Points	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS **EMC NO:** 1406-001 **DATE:** 16-Sep-95

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0723	BUILDING NAME:	MNT HANGAR COM	В
BLDG:	0723	BUILDING NAME:	MNT HANGAR CON	Λl

Building UA: 9,771 CONDITIONED SQFT: 21,640

#### SYTEM INFORMATION

System Type: 21

System Name: HW Unit heater

System Number: UH-3

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	3 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	f Winter: 32			

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	. 0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7.	7	7	.0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	0.25
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	740
CFM-CLG:	(
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	(
KW-TON:	0.00
BLR CAP INPUT (BTUH):	(
BLR CAP OUTPUT (BTUH):	

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	)
HTG HRS SAVED	3,776	5
C/H HRS SAVED	6,153	<u>;</u>

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM

BLDG: 0723 BUILDING NAME: MNT HANGAR COMB

ENERGY CALCULATION SUMMARY

System Type: 21

System Name: HW Unit heater

System Number: UH-3

FUNCTION :	<u>kWiyr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	866.74	0.00
Opt ST/SP	0.00	70.01	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	73.71
Sub Total	0.00	936.75	73.71
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			0. <b>73.71</b>

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO POINTS	T SUMMA  DI POINTS	IRY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	Ō	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0723	BUILDING NAME:	MNT HANGAR COMB	
	Building UA:	9.771	CONDITIONED SQFT:	21,640

#### SYTEM INFORMATION ---

System Type: 21

System Name: HW Unit heater

System Number: UH-4

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of S	ummer: 20			

### SYSTEM OPERATING SCHEDULE

200 5 20 cm	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.25
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	740
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED	: 2,360	-
HTG HRS SAVED	3,776	-
C/H HRS SAVED	6,153	•

<u>NSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	O
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	C
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 0723 BUILDING NAME: MNT HANGAR COMB

ENERGY CALCULATION SUMMARY

System Type: 21

System Name: HW Unit heater

System Number: UH-4

<u>FUNCTION</u>	<u>kWlyr</u> :	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	866.74	0.00	100
Opt ST/SP	0.00	70.01	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	73.71	
Sub Total	0.00	936.75	73.71	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.0

UMCS	TYPICAL SYSTEM	A POINT A	ND COS	T SUMM/	IRY Al	COST
FUNCTN NO.	UMCS APPLICATION	POINTS		POINTS	POINTS	
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL	1	0	1	2	\$1,213.00

# BUILDING 724 FLIGHT SIMULATOR

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**DATE**: 16-Sep-95

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0724	BUILDING NAME:	FLIGHT SIMULATOR	
Building UA:	3,237	CONDITIONED SQFT:	13,188
SYTEM INFORMATION	Total Control of the		

SYTEM INFORMATION	
System Type:	10
System Name:	Multizone air handling unit
System Number:	AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	BMETAL PANEL AND CMU	SIMULATOR BLDG	0600-1600	M-F
Weeks of	Winter: 32			
Weeks of S	ummer: 20	•		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,200
CFM-CLG:	6,200
%OA:	10%
%Area:	60%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED	2,460	)
HTG HRS SAVED	3,936	3
C/H HRS SAVED:	6,414	Ī

<u>CONSTANTS</u>	
HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
НОАОН:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0724 BUILDING NAME: FLIGHT SIMULATOR

ENERGY CALCULATION SUMMARY

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr 🕴	<u>MH/yr</u>
Schedule ST/SP	0.00	35,718.34	61.24	
Opt ST/SP	0.00	1,874.43	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	12,645.00	174.60	
Sub Total	0.00	50,237.77	235.84	
Economizer	0.00	4,087.95	0.00	
Ventilation/Recirculation	0.00	63.65	3.32	
DDC Control	0.00	1,774.84	79.24	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.0
TOTAL	0.00	56,164.20	318,41	, 5.0

TYPICAL SYSTEM POINT AND COST SUMMARY S						
UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST	
Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00	
Direct digital control - MZ AHU	0	7	0	8	\$3,378.00	
Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00	
Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00	
Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00	
	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU Direct digital control - MZ AHU Outside air damper ventilation and recirculation control - AHU Outside air damper economizer control - MZ AHU	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU Direct digital control - MZ AHU  Outside air damper ventilation and recirculation control - AHU  Outside air damper economizer  control - MZ AHU	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU Direct digital control - MZ AHU Outside air damper ventilation and recirculation control - AHU Outside air damper economizer Outside air damper economizer Outside AHU	Scheduled start/stop control - AHU; 1 0 0 Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU Direct digital control - MZ AHU 0 7 0 Outside air damper ventilation and recirculation control - AHU Outside air damper economizer 0 0 0 0 control - MZ AHU	POINTS POINTS POINTS POINTS  Scheduled start/stop control - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU  Direct digital control - MZ AHU 0 7 0 8  Outside air damper ventilation and recirculation control - AHU  Outside air damper economizer 0 0 0 2  control - MZ AHU	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

**DATE**: 16-Sep-95

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0724	BUILDING NAME:	FLIGHT SIMULATOR	
	Building UA:	3,237	CONDITIONED SQFT:	13,188

# SYTEM INFORMATION

System Type: 1	5
System Name: S	mall Single Zone air handling unit

TYPICALIBUIL	DING INFORMATION -			
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	18 METAL PANEL AND CMU	SIMULATOR BLDG	0600-1600	M-F

Weeks of Winter:	32
Weeks of Summer:	20

# SYSTEM OPERATING SCHEDULE

System Number: AHU-2

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,000
CFM-CLG:	6,000
%OA:	10%
%Area:	40%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON	1,440	5,376
H/C HRS ON	2,346	8,760
CLG HRS SAVED	2,460	- 
HTG HRS SAVED	3,936	-
C/H HRS SAVED	6,414	•

<u>CONSTANTS</u>	
HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
НОАОН:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0724 BUILDING NAME: FLIGHT SIMULATOR

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	35,680.50	59.26	
Opt ST/SP	0.00	1,874.43	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	12,237.09	116.40	
Sub Total	0.00	49,792.02	175.66	
Economizer	0.00	3,956.08	0.00	
Ventilation/Recirculation	0.00	61.60	3.22	
DDC Control	0.00	1,717.59	52.83	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	0.00	55,527.28	231.71	3.0

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO . POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0724	BUILDING NAME:	FLIGHT SIMULATOR

Building UA: 3,237

CONDITIONED SQFT:

CONSTANTS

13,188

#### SYTEMINFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

#### TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 18 METAL PANEL AND CMU SIMULATOR BLDG 0600-1600 M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
<b>REQ START:</b>	0	6	6	6	6	6	0
REQ STOP:	0	16	16	16	16	16	0

#### INPUTS Motor HP: 3.00 **HP Effic:** 0.79 Load Factor: 0.80 CFM-HTG: 0 CFM-CLG: 0 %OA: 0% %Area: 0% CHILLER CAP (TONS): 0 0.00

KW-TON:	0.00
BLR CAP INPUT (BTUH):	450,000
BLR CAP OUTPUT (BTUH):	360,000
Management of the state of the	

#### **HOURS CALCULATIONS**

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	~
C/H HRS SAVED:	6,153	

#### HOAUHC: 15.4 HOAUH: 24.8 COAUHC: 0.000295 COAUC: 0.000779 HOAOHC: 15.5 HOAOH: 25 COAOHC: 0.000155 0.00041 COAOC: DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0.000743 ECHC: 0.000281 **NSUCHC:** 0.000318 NSUCC: 0.000842 DDCCHC: 0.000122 DDCCC: 0.000321 NSC: 89900 DDCH: 40800 OPT: 348 CHWR: 17.5

CNWR:

OAR:

0

5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95 PREPARED BY: JM/AJN/AMS

BUILDING NAME: FLIGHT SIMULATOR BLDG: 0724

									T							

er Paler . . . System Type: Small hot water boiler System Name: System Number: BLR-1

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	8,557.66	0.00
Opt ST/SP	0.00	788.68	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	9,346.34	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	2.55
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.00
TOTAL	0.00	9,346.34	2.55 , 4.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

EMC NO: 1406-001 **DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0724	BUILDING NAME:	FLIGHT SIMULATOR	
	Building UA:	3,237	CONDITIONED SQFT:	13,188

#### SYTEM INFORMATION

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Occupancy HRS: Occupancy Days: SIMULATOR BLDG 0600-1600 M-F 18 METAL PANEL AND CMU

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	25
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	)
HTG HRS SAVED:	3,936	5
C/H HRS SAVED:	6,414	  -

<u>ONSTANTS</u>	
HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
НОАОН:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BUILDING NAME: FLIGHT SIMULATOR

ENERGY CALCULATION SUMMARY

System Type: 6

BLDG: 0724

System Name: Small air cooled chiller

System Number: CH-1

FUNCTION -	kW/yr	<u>kWh/yr</u>	MBtulyr MH/yr
Schedule ST/SP	0.00	5,575.17	0.00
Opt ST/SP	0.00	788.68	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.73	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	1.73	6,363.85	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	437.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	21.04	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:	4.0
TOTAL	22.77	6,801.35	0.00 4.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0724	BUILDING NAME:	FLIGHT SIMULATOR

Building UA: 3,237

CONDITIONED SQFT:

13,188

#### SYTEM INFORMATION

System Type: 6

System Name: Small air cooled chiller

System Number: CH-2

#### TYPICAL BUILDING INFORMATION

Catagory Number: Construction:	Use:	Occupancy HRS:	Occupancy Days:
18 METAL PANEL	AND CMU SIMULATOR BLDG	0600-1600	M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

## <u>INPUTS</u>

IMLO12	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	20
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	•
C/H HRS SAVED:	6,414	-

#### CONSTANTS

CONSTAINTS	
HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
нолон:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

LOCATION: FT. RILEY, KS

CATION: FT. RILEY, KS

# ENERGY CALCULATION SUMMARY

BUILDING NAME: FLIGHT SIMULATOR

System Type: 6

BLDG: 0724

System Name: Small air cooled chiller

System Number: CH-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH	lyr -
Schedule ST/SP	0.00	2,121.57	0.00	
Opt ST/SP	0.00	300.12	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.66	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.66	2,421.70	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	350.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	16.83	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.0
TOTAL	17.49	2,771.70	0.00	4.0

MCS NCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	O	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

C/H HRS SAVED:

0

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

5

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

OAR:

5.67

**DATE**: 16-Sep-95

ENERGY CALCULATION PARAMETERS

BLDG: 0724	·		В	UILDING	NAME:	FLIGHT	Γ SIMULATOR	-
Bu	ilding UA:		3,2	37		CON	DITIONED SQFT:	13,188
SYTEM INFOR	MATION							
	tem Type:8							
	em Name: A		X compre	2001	·			
·	Number: C		- , , GO				!	
TYPICAL BUIL			ION					
Catagory Number	Constru	iction:		Use:	2008104-19484444766A		Occupancy HRS:	Occupancy Days:
	18METAL	PANEL AN	ID CMU	SIMULA	TOR BLDG		0600-1600	M-F
Wooks	of Winter:		32					
	Summer:		20					
vveeks or	Summer.							
SYSTEM OPER	EATING S	CHEDUI	LE .	Service.			Profision Phil	
ital «Pagina a La La ila ila 1466 ila.	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:	Cigingangan) (1977) (1944) AC Siboli Bigibelo
PRES START	: 0	0	0	0	0	0	0	
PRES STOP	24	24	24	24	24	24	24	
REQ START	0	0	0	0	0	0	0	
REQ STOP	24	24	24	24	24	24	24	
	Motor HP:	N See Livin		0.00			STANTS HOAUHC:	15.
	HP Effic:			0.64				
10	Load Factor: 0.80						HOAUH:	24.
	·						COAUHC:	
	CFM-HTG:			0.80			COAUHC: COAUC:	24.
	CFM-HTG: CFM-CLG:			0.80			COAUHC: COAUC: HOAOHC:	24. 0.00029 0.00077 15.
	CFM-HTG: CFM-CLG: %OA:			0.80 0 0	-		COAUHC: COAUC: HOAOHC: HOAOH:	24. 0.00029 0.00077 15.
(	CFM-HTG: CFM-CLG: %OA: %Area:			0.80 0 0 0% 0%	-		COAUHC: COAUC: HOAOHC: HOAOH: COAOHC:	24. 0.00029 0.00077 15. 2 0.00015
	CFM-HTG: CFM-CLG: %OA: %Area: P (TONS):			0.80 0 0 0% 0% 10			COAUHC: COAUC: HOAOHC: HOAOH: COAOHC:	24. 0.00029 0.00077 15. 2 0.00015
CHILLER CA	%Area: P (TONS):			0.80 0 0% 0% 10 1.10	-		COAUHC: COAUC: HOAOHC: HOAOHC: COAOHC: COAOC:	24. 0.00029 0.00077 15. 2 0.00015 0.0004
CHILLER CA BLR CAP INPU	CFM-HTG: CFM-CLG: %OA: %Area: P (TONS): KW-TON: T (BTUH):			0.80 0 0 0% 0% 10 1.10	-		COAUHC: COAUC: HOAOHC: HOAOHC: COAOC: COAOC: DC DUTY: DC DEMAND:	24. 0.00029 0.00077 15. 2 0.00015 0.0004 0.1
CHILLER CA	CFM-HTG: CFM-CLG: %OA: %Area: P (TONS): KW-TON: T (BTUH):			0.80 0 0% 0% 10 1.10			COAUHC: COAUC: HOAOHC: HOAOHC: COAOC: COAOC: DC DUTY: DC DEMAND: ECC:	24. 0.00029 0.00077 15. 2 0.00015 0.0004 0.1 0.1
CHILLER CA	CFM-HTG: CFM-CLG: %OA: %Area: P (TONS): KW-TON: T (BTUH):			0.80 0 0 0% 0% 10 1.10	·		COAUHC: COAUC: HOAOHC: HOAOHC: COAOC: COAOC: DC DUTY: DC DEMAND: ECC: ECHC:	24. 0.00029 0.00077 15. 2 0.00015 0.0004 0.1 0.1 0.00074 0.00028
CHILLER CA BLR CAP INPU BLR CAP OUTPU	CFM-HTG: CFM-CLG: %OA: %Area: P (TONS): KW-TON: T (BTUH):			0.80 0 0 0% 0% 10 1.10			COAUHC: COAUC: HOAOHC: HOAOHC: COAOC: COAOC: DC DUTY: DC DEMAND: ECC: ECHC: NSUCHC:	24. 0.00029 0.00077 15. 2 0.00015 0.0004 0.1 0.1 0.00074 0.00028 0.00031
CHILLER CA BLR CAP INPU BLR CAP OUTPU	CFM-HTG: CFM-CLG: %OA: %Area: P (TONS): KW-TON: T (BTUH): T (BTUH):			0.80 0 0 0% 0% 10 1.10 0	-		COAUHC: COAUC: HOAOHC: HOAOHC: COAOC: COAOC: DC DUTY: DC DEMAND: ECC: ECHC: NSUCHC:	24. 0.00029 0.00077 15. 2 0.00015 0.0004 0.1 0.1 0.00074 0.00028 0.00031
CHILLER CA BLR CAP INPU	CFM-HTG: CFM-CLG: %OA: %Area: P (TONS): KW-TON: T (BTUH): T (BTUH):	UIRED I	PRESENT	0.80 0 0 0% 0% 10 1.10 0			COAUHC: COAUC: HOAOHC: HOAOHC: COAOC: COAOC: DC DUTY: DC DEMAND: ECC: ECHC: NSUCHC:	24. 0.00029 0.00077 15. 2 0.00015 0.0004 0.1 0.1 0.00074 0.00028 0.00031
CHILLER CA BLR CAP INPU BLR CAP OUTPU	CFM-HTG: CFM-CLG: %OA: %Area: P (TONS): KW-TON: T (BTUH): T (BTUH):  P (BTUH): REQ HRYY	UIRED I	PRESENT HR/YR	0.80 0 0 0% 0% 10 1.10 0	-		COAUHC: COAUC: HOAOHC: HOAOHC: COAOC: DC DUTY: DC DEMAND: ECC: ECHC: NSUCHC: DDCCHC:	24. 0.00029 0.00077 15. 2 0.00015 0.0004 0.1 0.1 0.00074 0.00028 0.00031 0.00084 0.00012
CHILLER CA BLR CAP INPU BLR CAP OUTPU HOURS CALC	CFM-HTG: CFM-CLG: %OA: %Area: P (TONS): KW-TON: T (BTUH): T (BTUH):  S ON:	UIRED I	PRESENT HR/YR 3	0.80 0 0 0% 0% 10 1.10 0			COAUHC: COAUC: HOAOHC: HOAOHC: COAOC: DC DUTY: DC DEMAND: ECC: ECHC: NSUCHC: NSUCC: DDCCHC:	24. 0.00029 0.00077 15. 2 0.00015 0.0004 0.1 0.1 0.00074 0.00028 0.00031 0.00084 0.00012 0.00032
CHILLER CA  BLR CAP INPU  BLR CAP OUTPU  HOURS CALCI	CFM-HTG: CFM-CLG: %OA: %Area: P (TONS): KW-TON: T (BTUH): T (BTUH): S ON: S ON:	UIRED I R I 3,360	PRESENT HR/YR 3 5	0.80 0 0% 0% 10 1.10 0 0			COAUHC: COAUC: HOAOHC: HOAOHC: COAOC: COAOC: DC DUTY: DC DEMAND: ECC: ECHC: NSUCHC: NSUCC: DDCCHC: DDCCC: NSC:	24. 0.00029 0.00077 15. 2 0.00015 0.0004 0.1 0.1 0.00074 0.00028 0.00031 0.00084 0.00012 0.00032
CHILLER CA BLR CAP INPU BLR CAP OUTPU HOURS CALC	CFM-HTG: CFM-CLG: %OA: %Area: P (TONS): KW-TON: T (BTUH): T (BTUH): S ON: S ON: S ON:	UIRED F R J 3,360 5,376	PRESENT HR/YR 3 5	0.80 0 0% 0% 10 1.10 0 0			COAUHC: COAUC: HOAOHC: HOAOHC: COAOC: COAOC: DC DUTY: DC DEMAND: ECC: ECHC: NSUCHC: NSUCC: DDCCHC: DDCCC: NSC:	24. 0.00029 0.00077 15. 2 0.00015 0.0004 0.1 0.1 0.00074 0.00028 0.00031 0.00084 0.00012 0.00032 8990 4080

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0724 BUILDING NAME: FLIGHT SIMULATOR

ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-3

<u>FUNCTION</u>	<u>kWiyr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	0.00	3.00

UMCS FUNCTN NO.	TYPICAL SYSTEN  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMM/ DI POINTS	ARY AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:		0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0724	BUILDING NAME:	FLIGHT SIMULATOR	
Building	3.237	CONDITIONED SQFT:	13,188

# SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-4

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	METAL PANEL AND CMU	SIMULATOR BLDG	0600-1600	M-F
Weeks of	Winter: 32			
Weeks of S				

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0.	0	. 0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	10
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

## HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED	: (	)
HTG HRS SAVED	; (	)
C/H HRS SAVED	: (	)

	CONSTANTS
15.4	HOAUHC:
24.8	HOAUH:
0.000295	COAUHC:
0.000779	COAUC:
15.5	HOAOHC:
25	HOAOH:
0.000155	COAOHC:
0.0004	COAOC:
0.17	DC DUTY:
0.1	DC DEMAND:
0.000743	ECC:
0.00028	ECHC:
0.000318	NSUCHC:
0.00084	NSUCC:
0.00012	DDCCHC:
0.00032	DDCCC:
8990	NSC:
4080	DDCH:
34	OPT:
17.	CHWR:
	CNWR:
5.6	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BUILDING NAME: FLIGHT SIMULATOR

ENERGY CALCULATION SUMMARY

System Type: 8

BLDG: 0724

System Name: Air cooled DX compressor

System Number: CH-4

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	- MBtu/yr	. <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
Maintenance, Run Time, and Safety Alarms TOTAL	.0.00	0.00	0.00	

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	DI	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	O	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0724	BUILDING NAME:	FLIGHT SIMULATOR

Building UA: 3,237 CONDITIONED SQFT: 13,188

#### SYTEM INFORMATION ...

System Type: 15
System Name: Small Single Zone air handling unit
System Number: CRU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
1	8 METAL PANEL AND CM	U SIMULATOR BLDG	0600-1600	:M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	. 0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	8,600
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	)
HTG HRS SAVED:	0	i
C/H HRS SAVED:	0	- !

<u>CONSTANTS</u>	
HOAUHC:	15.4
HOAUH:	24.8
COAUHC:	0.000295
COAUC:	0.000779
HOAOHC:	15.5
нолон:	25
COAOHC:	0.000155
COAOC:	0.00041
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000743
ECHC:	0.000281
NSUCHC:	0.000318
NSUCC:	0.000842
DDCCHC:	0.000122
DDCCC:	0.000321
NSC:	89900
DDCH:	40800
OPT:	348
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BUILDING NAME: FLIGHT SIMULATOR BLDG: 0724 

ENERGY CALCULATION SUMMARY

15 System Type:

Small Single Zone air handling unit System Name:

CRU-1 System Number:

FUNCTION -	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			,	3.00
TOTAL	0.00	0.00	0.00	3.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0724 **BUILDING NAME: FLIGHT SIMULATOR** 

**Building UA:** 3,237 CONDITIONED SQFT:

13,188

SYTEM INFORMATION ...

System Type: 15

System Name: Small Single Zone air handling unit

System Number: CRU-2

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 18 METAL PANEL AND CMU SIMULATOR BLDG 0600-1600 M-F

Weeks of Winter: Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

SUN: MON: TUE: WED: THUR: FRI: SAT: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 **REQ START:** 0 0 0. 0 0 0 0 24 REQ STOP: 24 24

0

**INPUTS** Motor HP: 5.00 **HP Effic:** 0.82 0.80 Load Factor: CFM-HTG: 0 CFM-CLG: 8,600 %OA: 0% 0% %Area: CHILLER CAP (TONS): 0 KW-TON: 0.00 **BLR CAP INPUT (BTUH):** 0

**HOURS CALCULATIONS** 

BLR CAP OUTPUT (BTUH):

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	: 0	
HTG HRS SAVED:	. 0	•
C/H HRS SAVED:	. 0	-

**CONSTANTS** HOAUHC: 15.4 HOAUH: 24.8 COAUHC: 0.000295 COAUC: 0.000779 HOAOHC: 15.5 25 HOAOH: COAOHC: 0.000155 COAOC: 0.00041 DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0.000743 ECHC: 0.000281 **NSUCHC:** 0.000318 NSUCC: 0.000842 DDCCHC: 0.000122 DDCCC: 0.000321 NSC: 89900 DDCH: 40800 OPT: 348 CHWR: 17.5 CNWR: 0 OAR: 5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0724 BUILDING NAME: FLIGHT SIMULATOR

#### ENERGY CALCULATION SUMMARY

System Type:

Small Single Zone air handling unit System Name:

CRU-2 System Number:

FUNCTION .	<u>kWiyr</u>	<u>kWh/yr</u> <u>l</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.00	0.00	0.00

UMCS UNCIN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

## BUILDING 727 MAINTENANCE HANGAR COMB

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

**DATE**: 16-Sep-95

#### **ENERGY CALCULATION PARAMETERS**

BUILDING NAME: MNT HANGAR COMB BLDG: 0727

**Building UA:** 13,826 CONDITIONED SQFT: 36,152

SYTEMINEORMATION:

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-1

TYPICAL BUILDING INFORMATION

Construction: Catagory Number: Use: Occupancy HRS: Occupancy Days: 7 BRICK AND CMU BATTALION 0700-1800 M-F; SAT

Weeks of Winter: 32 20 Weeks of Summer:

SYSTEM OPERATING SCHEDULE

FRI: SUN: MON: TUE: WED: THUR: SAT: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 7 **REQ START:** 0 7 7 7 7 0 **REQ STOP:** 0 0 16 16 16 16 16

INPUTS	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	16
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS	CALCU	ILAT	ONS
Mile 6- hands the of the street have	100 House September 100 House	Charmon Silin	20000000000000000000000000000000000000

	HR/YR	HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED	3,936	-
C/H HRS SAVED:	6,414	•

	<u>NSTANTS</u>
16.2	HOAUHC:
26.1	HOAUH:
0.000257	COAUHC:
0.00068	COAUC:
33.3	HOAOHC:
53.5	нолон:
0.00115	COAOHC:
0.00305	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0002	ECC:
0.0000795	ECHC:
0.00094	NSUCHC:
0.00249	NSUCC:
0.000233	DDCCHC:
0.000616	DDCCC:
36600	NSC:
30100	DDCH:
305	OPT:
17.5	CHWR:
(	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0727 BUILDING NAME: MNT HANGAR COMB
ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-1

FUNCTION	<u>kWiyr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00:	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	280.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	13.46	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00 · 3.

ÚMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	ND COS AO POINTS	T SUMMA  DI: POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0727	BUILDING NAME: MNT HANGAR COMB

Building UA: 13,826

CONDITIONED SQFT:

36,152

#### SYTEM INFORMATION:

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-2

## TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 7 BRICK AND CMU BATTALION 0700-1800 M-F; SAT Weeks of Winter: 32

Weeks of Summer: 20

						. 4 reserves - or manufactures (50°	renament at all estimates
SYSTEM OPERA	TING S	CHEDUL	E				
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7,	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	15
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	YR HR/	<u>r</u>
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

	<u>ONSTANTS</u>
16.2	HOAUHC:
26.1	HOAUH:
0.000257	COAUHC:
0.00068	COAUC:
33.3	нолонс:
53.5	нолон:
0.00115	COAOHC:
0.00305	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0002	ECC:
0.000079	ECHC:
0.00094	NSUCHC:
0.00249	NSUCC:
0.00023	DDCCHC:
0.00061	DDCCC:
3660	NSC:
3010	DDCH:
30	OPT:
17.	CHWR:
	CNWR:
5.6	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0727	BUILDING NAME: MNT HANGAR COMB
	ENERGY CALCULATION SUMMARY
System Type:	18
System Name:	Air cooled DX compressor
System Number:	ACCU-2

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	262.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	12.62	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			0.00

UMCS FUNCTN NO.	TYPICAL SYSTEN  UMCS APPLICATION	POINT A  DO  POINTS	AO POINTS	DI	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0727	BUILDING NAME:	MNT HANGAR COMB

**Building UA:** 13,826 CONDITIONED SQFT:

36,152

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: **7 BRICK AND CMU BATTALION** 0700-1800 M-F; SAT Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	5,160
CFM-CLG:	5,160
%OA:	10%
%Area:	12%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	=  -
C/H HRS SAVED:	6,414	-

ONSTANTS	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0727

BUILDING NAME: MNT HANGAR COMB

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	24,304.07	53.61	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	31,141.48	60.72	
Sub Total	7.46	56,560.89	114.34	
Economizer	0.00	962.55	0.00	
Ventilation/Recirculation	0.00	40.45	2.55	
DDC Control	0.00	2,821.06	49.94	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	60,384.95	166.83	• 3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

EMC NO: 1406-001

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0727	BUILDING NAME:	MNT HANGAR COMB
DEDO.	0, 2,		

**Building UA:** 13,826

36,152 CONDITIONED SQFT:

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

#### PYPICAL BUILDING INFORMATION Occupancy Days: Occupancy HRS: Construction: Use: Catagory Number: M-F; SAT 0700-1800 **BATTALION** 7 BRICK AND CMU 32 Weeks of Winter:

#### SYSTEM OPERATING SCHEDULE

Weeks of Summer:

77.57.447.027.000000	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0.	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

20

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	1,175
CFM-CLG:	1,175
%OA:	10%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	j
HTG HRS SAVED:	3,936	- <b>j</b>
C/H HRS SAVED:	6,414	

<u>ONSTANTS</u>	
HOAUHC:	16.3
HOAUH:	26.
COAUHC:	0.00025
COAUC:	0.0006
НОАОНС:	33.
НОАОН:	53.
COAOHC:	0.0011
COAOC:	0.0030
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.0002
ECHC:	0.000079
NSUCHC:	0.00094
NSUCC:	0.0024
DDCCHC:	0.00023
DDCCC:	0.00061
NSC:	3660
DDCH:	3010
OPT:	30
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0727 BUILDING NAME: MNT HANGAR COMB

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	5,724.92	12.21	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	7,091.33	25.30	
Sub Total	1.76	13,079.28	37.51	
Economizer	0.00	219.19	0.00	
Ventilation/Recirculation	0.00	9.21	0.58	
DDC Control	0.00	642.39	20.81	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	1.76	13,950.07	58.90	3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

Occupancy Days:

M-F

**DATE:** 09-Dec-95 LOCATION: FT. RILEY, KS PREPARED BY: JM/AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0727	BUILDING NAME:	MNT HANGAR COMB

**Building UA:** 13,826 CONDITIONED SQFT: 36,152

VEH MAINT SHOP

0700-1800

#### SYTEMINEORNATION ...

System Type: 3 System Name: Small steam boiler

System No	umber: BLR-1		
HYPICAL BUILDI	<u>NG INFORMAT</u>	TON A CARLO SERVICE	
Catagory Number:	Construction:	Use:	Occupancy HRS:

Weeks of Winter: 32 Weeks of Summer: 20

13 METAL PANEL AND CMU

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

NPUTS	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	33%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	4,181,000
BLR CAP OUTPUT (BTUH):	3,350,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 09-Dec-95

PREPARED BY: JM/AJN/AMS

BLDG: 0727

BUILDING NAME: MNT HANGAR COMB

ENERGY CALCULATION SUMMARY

System Type: 3
System Name: Small steam boiler

System Number: BLR-1

FUNCTION	kWiyir -	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring,			4.
Maintenance, Run Time,		· ·	
and Safety Alarms		1	0.00 4.

UMCS FUNCTI NO.	TYPICAL SYSTE  UMCS APPLICATION	.DO	AO 💮	DI	RY AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TOTAL:	1	0	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0	727	<b>BUILDING NAME:</b>	MNT HANGAR COMB
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CONDITIONED SQFT: 36,152 13,826 **Building UA:** 

#### SYTEM INFORMATION ...

System Type: 1

System Name: Small hot water boiler

System Number: BLR-2

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

32 Weeks of Winter: Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	٠. ٥	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>inputs</u>	
Motor HP:	3.00
HP Effic:	0.72
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	450,000
BLR CAP OUTPUT (BTUH):	360,000

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	900	3,360
HTG HRS ON	1,440	5,376
H/C HRS ON	2,346	8,760
CLG HRS SAVED	: 2,460	- 
HTG HRS SAVED	: 3,936	
C/H HRS SAVED	: 6,414	

| HOAUHC: (COAUHC: ---|
| COAUHC: (COAUC: (COAUC: (COAUC: (COAUC: (COAUC: (COAUC: (COAUC: (COAUC)))))  |
| COAUC: (   |
| HOAOHC:  |
|  |
| HOAOH:   |
|  |
| COAOHC:  |
| COAOC:   |
| DC DUTY: 0.17  |
| DC DEMAND: 0.17  |
| ECC:   |
| ECHC: (  |
| NSUCHC: 0.00010  |
| NSUCC: 0.000278  |
| <b>DDCCHC:</b> 0.00016   |
| DDCCC: 0.000426  |
| NSC: 94300   |
| DDCH: 40600  |
| OPT: 305   |
| CHWR: 17.5   |
| CNWR:  |
| OAR: 5.6   |

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 0727 BUILDING NAME: MNT HANGAR COMB

ENERGY CALCULATION SUMMARY

System Type: 1

System Name: Small hot water boiler

System Number: BLR-2

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr / MH/yr
0.00	9,855.96	0.00
0.00	763.74	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	10,619.70	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	2.55
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		4.
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         9,855.96           0.00         763.74           0.00         0.00           0.00         0.00           0.00         0.00           0.00         10,619.70           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

**DATE:** 16-Sep-95

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0727 **BUILDING NAME: MNT HANGAR COMB** 

> **Building UA:** 13,826

**CONDITIONED SQFT:** 

36,152

SYTEM INFORMATION ....

System Type: 5

System Name: Steam to hot water converter

System Number: CV-1

TYPICAL BUILD	NG INFORMATION
	Dan Marian Company of the Company of
la	i

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0,80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	33%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,000,000
BLR CAP OUTPUT (BTUH):	1,000,000

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

CONSTANTS	
HOAU	HC: 0
HOA	UH: 0
COAU	HC: 0
COA	UC: 0
HOAO	HC: 0
HOA	OH: 0
COAO	HC: 0
COA	OC: 0
DC DU	<b>TY:</b> 0.17
DC DEMA	<b>ND:</b> 0.17
E	CC: 0
EC	HC: 0
NSUC	HC: 0.000105
NSU	CC: 0.000278
DDCC	HC: 0.000161
DDC	CC: 0.000426
N:	SC: 94300
DD	CH: 40600
0	PT: 305
CHV	<b>VR</b> : 17.5
CNV	VR: 0
O	AR: 5.67

BLDG: 0727

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BUILDING NAME: MNT HANGAR COMB

ENERGY CALCULATION SUMMARY

System Type: 5
System Name: Steam to hot water converter

System Number: CV-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MFI/yr
Schedule ST/SP	0.00	3,394.52	0.00
Opt ST/SP	0.00	263.04	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	3,657.56	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	5.67
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00 5.67 3.00

MCS NCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.0

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0727	BUILDING NAME:	MNT HANGAR COMB
		10.000	CONDITIONED COET.

Building UA: 13,826

CONDITIONED SQFT:

**CONSTANTS** 

36,152

0

305 17.5

0 5.67

#### SYTEM INFORMATION ....

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-1

## TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

500.00 ( 4.70.000 000 000 00 ) *********************	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,000
CFM-CLG:	0
%OA:	100%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### **HOURS CALCULATIONS**

		RESENT R/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

#### HOAUH: 0 0 COAUHC: 0 COAUC: 0 HOAOHC: 0 нолон: 0 COAOHC: COAOC: 0 0.17 DC DUTY: DC DEMAND: 0.17 0 ECC: 0 ECHC: 0.000105 **NSUCHC:** 0.000278 NSUCC: DDCCHC: 0.000161 DDCCC: 0.000426 94300 NSC: 40600 DDCH:

OPT:

OAR:

CHWR:

HOAUHC:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 0727 BUILDING NAME: MNT HANGAR COMB

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit

System Number: HV-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	1,779.55	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	104.30	
Sub Total	0.00	1,917.45	104.30	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	44.91	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0727	BUILDING NAME:	MNT HANGAR COMB
			CONDITIONED COET.

**Building UA:** 

CONDITIONED SQFT:

36,152

#### SYTEM INFORMATION

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

#### TYPICAL BUILDING INFORMATION

Construction: Catagory Number:

Use:

Occupancy HRS:

Occupancy Days:

**ADMINISTRATION 4 SANDSTONE BLOCK** 

32

20

0700-1700

Weeks of Winter: Weeks of Summer:

#### SYSTEM OPERATING SCHEDULE

Paristrain Definition (Section 2)	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

## Motor HD

Motor nr.	3.00
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	33%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
нолон:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

#### **HOURS CALCULATIONS**

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	- 
HTG HRS SAVED:	3,936	i
C/H HRS SAVED:	6,414	-

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95 **PREPARED BY**: JM/AJN/AMS

BUILDING NAME: MNT HANGAR COMB

ENERGY CALCULATION SUMMARY

System Type: 25

BLDG: 0727

resident Kein

System Name: Hot water radiation pump

System Number: RAD-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u> .	MBtu/yr MH/yr
Schedule ST/SP	0.00	9,522.99	0.00
Opt ST/SP	0.00	737.94	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	10,260.93	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0

UMCS FUNCTIN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO	AO	DI	RY AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
	TOTAL:	1	0	1	1	\$570.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

LOCATION: FT. RILEY, KS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0727	BUILDING NAME:	MNT HANGAR COMB
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Building UA: 13,826 CONDITIONED SQFT: 36,152

#### SYTEM INFORMATION

System Type: 21
System Name: HW Unit heater
System Number: UH-1

#### TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:

13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

## Motor HP: 0.33

motor tit.	0.55
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	2,800
CFM-CLG:	0
%ÓA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	-
HTG HRS SAVED:	3,936	-
C/H HRS SAVED:	6.414	-

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0727 BUILDING NAME: MNT HANGAR COMB

ENERGY CALCULATION SUMMARY

System Type: 21
System Name: HW Unit heater

System Number: UH-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	1,192.57	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	97.78	
Sub Total	0.00	1,284.98	97.78	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINT A	ND COS AO POINTS	T SUMMA  DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	O	1	2	\$1,213.00
	TOTAL:		0	7	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0727	JILDING NAME: MNT HANGAR COMB
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36,152 CONDITIONED SQFT: **Building UA:** 13,826

#### SYTEM INFORMATION

System Type: 21 System Name: HW Unit heater System Number: UH-2

## TYPICAL BUILDING INFORMATION

Occupancy HRS: Occupancy Days: Catagory Number: Construction: Use: 13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	. 0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

#### **NPUTS** 0.33 Motor HP: 0.65 HP Effic: 0.80 Load Factor: 2,800 CFM-HTG: CFM-CLG: 2,800 0% %OA: 8% %Area: 0 CHILLER CAP (TONS): 0.00 KW-TON: **BLR CAP INPUT (BTUH):** 0 0

#### HOURS CALCULATIONS

BLR CAP OUTPUT (BTUH):

		PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED	3,936	-
C/H HRS SAVED:	6,414	-

CONSTANTS	
HOAUHC:	0
HOAUH:	- 0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 0727 BUILDING NAME: MNT HANGAR COMB

ENERGY CALCULATION SUMMARY

System Type: 21
System Name: HW Unit heater
System Number: UH-2

<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u>	MH/yr
0.00	1,192.57	0.00	
0.00	92.41	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	97.78	
0.00	1,284.98	97.78	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			0.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         1,192.57           0.00         92.41           0.00         0.00           0.00         0.00           0.00         0.00           0.00         1,284.98           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         1,192.57         0.00           0.00         92.41         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         97.78           0.00         1,284.98         97.78           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	ND COS	SUMMA DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

EMC NO: 1406-001 **DATE:** 16-Sep-95

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0727	BUILDING NAME:	MNT HANGAR COMB
	Building UA:	13,826	CONDITIONED SQFT:

Building UA:

36,152

#### SYTEM INFORMATION

System Type: 21 System Name: HW Unit heater

System Number: UH-3

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1.	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of S	ummer: 20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	. 0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	2,800
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	<u> </u>
C/H HRS SAVED:	6,414	•

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	C
OAR:	5.67

BLDG: 0727

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BUILDING NAME: MNT HANGAR COMB

#### ENERGY CALCULATION SUMMARY

System Type: 21
System Name: HW Unit heater

System Number: UH-3

- FUNCTION	- <u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	1,192.57	0.00
Opt ST/SP	0.00	92.41	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	97.78
Sub Total	0.00	1,284.98	97.78
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			0.00
TOTAL	0.00	1,284.98	97.78

UMCS	TYPICAL SYSTEM	I POINT A	ND COS	TSUMMA	RY :	
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:		0		2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0727	BUILDING N	IAME: MNT HANGAR COMB	
Building UA	13,826	CONDITIONED SQFT:	36,152
SYTEM INFORMATION			
System Type	21		
System Name	:HW Unit heater		
System Number	1111		

TYPICAL BUILD	ING INFORMATION	I de la companya de la companya de la companya de la companya de la companya de la companya de la companya de		
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	3 METAL PANEL AND (	MU VEH MAINT	SHOP 0700-1800	M-F
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	. 0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	2,800
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR 900 CLG HRS ON: 3,360 HTG HRS ON: 1,440 5,376 H/C HRS ON: 2,346 8,760 2,460 CLG HRS SAVED: HTG HRS SAVED: 3,936 C/H HRS SAVED: 6,414

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 0727 BUILDING NAME: MNT HANGAR COMB

ENERGY CALCULATION SUMMARY

System Type: 21

System Name: HW Unit heater

System Number: UH-4

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	<u>MBtu/yr</u>	MH/yr
Schedule ST/SP	0.00	1,192.57	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	97.78	
Sub Total	0.00	1,284.98	97.78	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	.AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL	1	0	1	2	\$1,213.00

## BUILDING 741 MAINTENANCE HANGAR COMB

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0741 BUILDING NAME: MN	VINT HANGAR COMB
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Building UA: 14,876 CONDITIONED SQFT: 38,898

#### SYTEM INFORMATION -

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

#### TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:

13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	Ō
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	. 0	17	17	17	15	17	0

0

#### INPUTS 5.00 Motor HP: **HP Effic:** 0.82 Load Factor: 0.80 CFM-HTG: 14,200 CFM-CLG: 0 0% %OA: %Area: 25% CHILLER CAP (TONS): 0 KW-TON: 0.00 **BLR CAP INPUT (BTUH):** 0

**BLR CAP OUTPUT (BTUH):** 

#### HOURS CALCULATIONS REQUIRED PRESENT CLG HRS ON: 900 3,360 HTG HRS ON: 1,440 5,376 H/C HRS ON: 8,760 2,346 CLG HRS SAVED: 2,460 HTG HRS SAVED: 3,936 C/H HRS SAVED: 6,414

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

**EMC NO**: 1406-001 **DATE**: 16-Sep-95

PREPARED BY: JM

BLDG: 0741 BUILDING NAME: MNT HANGAR COMB
ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

FUNCTION	kW/vr /	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	14,393.41	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	350.70	
Sub Total	0.00	15,508.75	350.70	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	150.99	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		15,508.75	501.69	3

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO:** 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0741	BUILDING NAME:	MNT HANGAR COMB	
	Building UA:	14,876	CONDITIONED SQFT:	38,898
	***************************************			

#### SYTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-2

TYPICAL BUILD	NG INFORMATION			
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1:	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of S	ummer: 20	•		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

<u>inputs</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	14,200
CFM-CLG:	0
%OA:	0%
%Area:	25%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 900 3,360 HTG HRS ON: 1,440 5,376 H/C HRS ON: 2,346 8,760 CLG HRS SAVED: 2,460 HTG HRS SAVED: 3,936 C/H HRS SAVED: 6,414

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM

BLDG: 0741 BUILDING NAME: MNT HANGAR COMB

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

FUNCTION	<u>kWiyr</u>	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	14,393.41	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	350.70	
Sub Total	0.00	15,508.75	350.70	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	150.99	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.i

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	· 1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0741 BUILD	ING NAME: MNT HANGAR COMB
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Building UA: 14,876 CONDITIONED SQFT: 38,898

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

#### TYPICAL BUILDING INFORMATION

 Catagory Number:
 Construction:
 Use:
 Occupancy HRS:
 Occupancy Days:

 13 METAL PANEL AND CMU
 VEH MAINT SHOP
 0700-1800
 M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

# Motor HP: 5.00 HP Effic: 0.82 Load Factor: 0.80 CFM-HTG: 14,200 CFM-CLG: 0 %OA: 0% %Area: 25%

CFM-CLG:	0
%OA:	0%
%Area:	25%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0

#### **HOURS CALCULATIONS**

**BLR CAP OUTPUT (BTUH):** 

	HR/YR	HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED	: 2,460	
HTG HRS SAVED:	3,936	•
C/H HRS SAVED:	: 6,414	•

#### **CONSTANTS** HOAUHC: 0 0 HOAUH: COAUHC: 0 0 COAUC: HOAOHC: 0 0 HOAOH: COAOHC: 0 0 COAOC: DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0 0 ECHC: **NSUCHC:** 0.000105 NSUCC: 0.000278 DDCCHC: 0.000161 DDCCC: 0.000426 NSC: 94300 DDCH: 40600 OPT: 305 CHWR: 17.5 CNWR: 0 OAR: 5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM

BLDG: 0741 BUILDING NAME: MNT HANGAR COMB

ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit

System Number: AHU-3

FUNCTION 1	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	14,393.41	0.00
Opt ST/SP	0.00	1,115.34	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	350.70
Sub Total	0.00	15,508.75	350.70
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	150.99
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			501.69

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS CS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0741	BUILDING NAME:	MNT HANGAR COMB

Building UA: 14,876

CONDITIONED SQFT:

38,898

## SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of S	ummer: 20			

# SYSTEM OPERATING SCHEDULE

AM BORD OF A STRUCTURE OF STRUC	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	14,200
CFM-CLG:	0
%OA:	0%
%Area:	25%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED	2,460	<u> </u>
HTG HRS SAVED	3,936	5
C/H HRS SAVED	6,414	ļ

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001 DATE: 16-Sep-95

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0741 BUILDING NAME: MNT HANGAR COMB

# ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

kW/yr	<u>kWh/yr</u>	MBtu/yr M	H/yr
0.00	14,393.41	0.00	
0.00	1,115.34	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	350.70	
0.00	15,508.75	350.70	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	150.99	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         14,393.41           0.00         1,115.34           0.00         0.00           0.00         0.00           0.00         0.00           0.00         15,508.75           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         14,393.41         0.00           0.00         1,115.34         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         350.70           0.00         15,508.75         350.70           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         150.99           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BI DG:	0741	BUILDING NAME:	MNT HANGAR COMB

CONDITIONED SQFT: 14,876

**Building UA:** 

38,898

#### SYTEM INFORMATION

System Type: 4

System Name: Large steam boiler

System Number: BLR-1

# TYPICAL BUILDING INFORMATION

Occupancy Days: Occupancy HRS: Catagory Number: Construction: M-F 0700-1800 VEH MAINT SHOP 13 METAL PANEL AND CMU

Weeks of Winter:

20 Weeks of Summer:

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0:	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	15	17	0

#### **INPUTS** 0.00 Motor HP:

0.00	115 F#
0.00	HP Effic:
0.80	Load Factor:
0	CFM-HTG:
0	CFM-CLG:
0%	%OA:
0%	%Агеа:
0	CHILLER CAP (TONS):
0.00	KW-TON:

7,071,000 BLR CAP INPUT (BTUH): 5,657,000 BLR CAP OUTPUT (BTUH):

#### **HOURS CALCULATIONS**

	REQUIRED PRE	
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED	3,936	
C/H HRS SAVED	6,414	

# CONSTANTS

0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	ноаон:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0.000105	NSUCHC:
0.000278	NSUCC:
0.000161	DDCCHC:
0.000426	DDCCC:
94300	NSC:
40600	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG:	0741	<b>BUILDING NAME:</b>	MNT HANGAR COMB
	ENERG	SY CALCULAT	ION SUMMARY

System Type: 4
System Name: Large steam boiler

System Number: BLR-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	670.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			,	26.0
TOTAL	0.00	0.00	670.00	26.0

5,57,554		TYPICAL SYSTEM	A POINT A	ND COST	TSUMMA	RY		
UMCS FUNCT		APPLICATION	DO	AO	DI	AI	COST	
NO.					POINTS	POINTS		
6	Remote Boiler	Monitoring - STM	0	0	4	4	\$5,286.00	
	Boiler							
		TOTAL:	0	0	4	4	\$5,286.00	

# BUILDING 751 AC PTS & TOE ST

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

Building UA: CONDITIONED SQFT: 3,641 9,834

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

#### TYPICAL BUILDING INFORMATION Use: Catagory Number: Construction: Occupancy HRS: Occupancy Days: 3 BRICK AND CMU **ADMIN & SUPPLY** 0700-1600 M-F 32 Weeks of Winter: 20 Weeks of Summer:

#### SYSTEM OPERATING SCHEDULE

	'SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0.	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	1,200
CFM-CLG:	1,200
%OA:	10%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,00	0 3,360
HTG HRS ON:	1,60	0 5,376
H/C HRS ON:	2,60	7 8,760
CLG HRS SAVED	2,36	0
HTG HRS SAVED	3,77	<u></u>
C/H HRS SAVED	6,15	3

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PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

**EMC NO**: 1406-001 **DATE**: 16-Sep-95

PREPARED BY: JM/AJN/CWW

BLDG: 0751 BUILDING NAME: AC PTS & TOE ST

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtulyr MH/yr
Schedule ST/SP	0.00	1,864.26	0.00
Opt ST/SP	0.00	92.41	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.62	0.00	0.00
Night Setback	0.00	1,668.65	33.90
Sub Total	0.62	3,625.33	33.90
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	58.82	10.89
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.62	3,684.14	44.78 3.00

IMCS INCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0751	BUILDING NAME	: AC PTS & TOE ST	
	Building UA:	3,641	CONDITIONED SQFT:	9,834

# SYTEM NEORMATION .

System Type:	3
System Name:	Small steam boiler
System Number:	BLR-1

#### EYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 3 BRICK AND CMU ADMIN & SUPPLY 0700-1600 M-F Weeks of Winter: 32 Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:		THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

NPUTS 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	770,000
BLR CAP OUTPUT (BTUH):	616,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	1
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	. 0
COAOC:	0
DC DUTY:	0.17;
DC DEMAND:	0.17
ECC:	0.
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 09-Dec-95

PREPARED BY: JM/AJN/CWW

BUILDING NAME: AC PTS & TOE ST BLDG: 0751 

ENERGY CALCULATION SUMMARY

System Type: 3

System Name: Small steam boiler

BLR-1 System Number:

FUNCTION :	kW/yr	kWh/yr	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

<b>5</b> .	TYPICAL SY	STEM POINT AN	ID COST	SUMMA	RY	
FUNCTI	UMCS APPLICATION	DO	AO	DI	AI	COST
NO.		The second secon			POINTS	
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
			Maria de la companya della companya de la companya de la companya della companya	AND THE PROPERTY OF THE PROPER	r company of the language of t	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0751	BUILDING NAME:	AC PTS & TOE ST	
	Building UA:	3,641	CONDITIONED SQFT:	9,834

# SYTEM INFORMATION

System Type: 8 System Name: Air cooled DX compressor

System Number: CH-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32	•		
Weeks of S	Summer:	20			

# SYSTEM OPERATING SCHEDULE

44 Tanana 1900 Tanana 1900 Tanana 1900 Tanana 1900 Tanana 1900 Tanana 1900 Tanana 1900 Tanana 1900 Tanana 1900	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	3
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	•
C/H HRS SAVED:	6,153	-

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
НОАОНС:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: JM/AJN/CWW

**DATE**: 16-Sep-95

BUILDING NAME: AC PTS & TOE ST

ENERGY CALCULATION SUMMARY

System Type: 8

BLDG: 0751

System Name: Air cooled DX compressor

System Number: CH-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	52.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	2.52	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	2.52	52.50	0.00 3.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A DO POINTS	ND COS AO POINTS	DI	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/CWW

**DATE**: 16-Sep-95

**ENERGY CALCULATION PARAMETERS** 

BLDG: 0751		BUILDING NA	ME: AC PTS & TOE ST	
Buil	ding UA:	3,641	CONDITIONED SQFT:	9,834
SYTEM INFORM	<u>IATION</u>			
Syste	em Type: 21	and the second s	er opprogrammen geringen en versprommen stillstelliste menten opprogrammen til stillstelliste til stillstell	and the state of t
Syste	m Name: HW Unit he	ater		
System	Number: UH-1			
TYPICAL BUILD	ING INFORMAT	<u>ON</u>		
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SU	PPLY 0700-1600	M-F
Weeks o	f Winter:	32		
Weeks of	Summer:	20		

FRI:

SAT:

	SUN:	MON:	TUE:	WED:	THUR:
PRES START:	<del></del>	_			

 PRES START:
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Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	7,200
CFM-CLG:	0
%OA:	0%
%Area:	90%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	0

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	-
HTG HRS SAVED:	3,776	-
C/H HRS SAVED:	6,153	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/CWW

BLDG: 0751

BUILDING NAME: AC PTS & TOE ST

ENERGY CALCULATION SUMMARY

System Type: 21

System Name: HW Unit heater

System Number: UH-1

EUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	8,557.66	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	305.08	
Sub Total	0.00	9,248.89	305.08	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	9,248.89	305.08	.0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	DO	AND COS AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

# BUILDING 760 BN HQ BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE:** 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0760 BUILDING NAME: BN HQ BLDG

**Building UA:** 3,399 CONDITIONED SQFT: 7,364

#### SYTEM INFORMATION

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter: 32 Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	. 0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

<u>nputs</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	672,000
BLR CAP OUTPUT (BTUH):	558,000

#### FOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 840 3,360 HTG HRS ON: 1,344 5,376 H/C HRS ON: 2,190 8,760 **CLG HRS SAVED:** 2,520 HTG HRS SAVED: 4,032 C/H HRS SAVED: 6,570

<u>CONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

:DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 09-Dec-95

PREPARED BY: JM

BLDG: 0760 BUILDING NAME: BN HQ BLDG
ENERGY CALCULATION SUMMARY

System Type: 3
System Name: Small steam boiler

System Number: BLR-1

FUNCTION	- kWive	kWh/yr	MBtwyr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	. 0.00	
Duty Cycle	0.00	0.00	0.00,	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				4.0
Maintenance, Run Time,			•	
and Safety Alarms			0.00	∴.4.(
TOTAL	0.00	0.00	v.wj	Name of the

UMCS	4			SUMMA DI	RY AT	COST
VUNCT NO.	· 100 200 100 100 100 100 100 100 100 100	DO POINTS	POINTS		POINTS	\$1,015.00
7	Steam Boiler Monitoring	 	· ·		<u>'</u>	
	TOTAL:	1.1	0	3	1.	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0760	BUILDING NAME:	BN HQ BLDG	
	Building UA:	3,399	CONDITIONED SQFT:	7,364
NATE NA				
SHIEM	INFURMATION	**************************************		
STIEM	System Type: 27			
~3@1 <b>=</b> 10	System Type: 27 System Name: Perimetel	r radiation valve		

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH)::	0

		PRESENT
	HR/YR	HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED	2,520	ļ,
HTG HRS SAVED	4,032	-
C/H HRS SAVED:	6,570	- 

<u>CONSTANTS</u>	****
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0760 BUILDING NAME: BN HQ BLDG

# ENERGY CALCULATION SUMMARY

System Type: 27
System Name: Perimeter radiation valve

System Number: RAD-1

FUNCTION :	kW/yr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.00	0.00	0.00 3.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMMA  DI  POINTS	ARY AI POINTS	COST
25	Optimum start/stop - Perimeter Rad Valve; Night setback - Perimeter Rad Valve	0	1	0	1	\$456.00
	TOTAL	0	1	0		\$456.00

# BUILDING 802 BN ADMINISTRATION& CLASSROOMS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

**Building UA:** CONDITIONED SQFT: 5,781

12,526

# SYTEM INFORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	of Winter:	32		

Weeks of Summer:

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	. 0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	30.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	7,605
CFM-CLG:	7,605
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0

## HOURS CALCULATIONS

BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	940	3,360
HTG HRS ON:	1,504	5,376
H/C HRS ON:	2,451	8,760
CLG HRS SAVED	2,420	-  -
HTG HRS SAVED	3,872	-
C/H HRS SAVED:	6,309	1

HOAUHC: HOAUH: COAUHC:	16.2 26.1 0.000257 0.00068
COAUHC:	0.000257 0.00068
	0.00068
COAUC:	
HOAOHC:	33.3
нолон:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM

BLDG: 0802 BUILDING NAME: BN ADMIN & CLRM

**ENERGY CALCULATION SUMMARY** 

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

FUNCTION P	<u>kW/vr</u>	<u>kWh/yr</u>	<u>MBtwyr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	131,523.17	77.73	
Opt ST/SP	0.00	6,298.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	42.13	0.00	0.00	
Night Setback	0.00	45,151.17	211.58	
Sub Total	42.13	182,972.75	289.32	
Economizer	0.00	1,481.70	0.00	
Ventilation/Recirculation	0.00	59.61	3.76	
DDC Control	0.00	4,342.58	174.01	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			467.08	5.0

	TYPICAL SYSTEM	POINT A	ND COS	T SUMM/	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	8		11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0802		BUILDING	NAME: E	E: BN ADMIN & CLRM		
	Building UA:		5,781	<u> </u>	CONDITIONED SQFT:	12,526	
SYTEM	INFORMATION		44 C				
	System Type:	26	nie 19therae it terrete en er er 1944	gendly to adj government and 200 or 100.		,	
	System Name:	Pump			i		
	System Number:	CIAID 1					

Catagory Number:	Construction:	Use:		Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTAL	ION	0700-1800	M-F; SAT
Weeks o	f Winter:	32	•		
Weeks of S	Summer:	20			

# SYSTEM OPERATING SCHEDULE

MO: 100/1907 11 1 - \$40.0 - \$40.00	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT 940 3,360 CLG HRS ON: 5,376 1,504 HTG HRS ON: 8,760 2,451 H/C HRS ON: 2,420 CLG HRS SAVED: 3,872 HTG HRS SAVED: 6,309 C/H HRS SAVED:

<u>TANTS</u>	
HOAUHC:	16.2
HOAUH:	26.
COAUHC:	0.00025
COAUC:	0.0006
HOAOHC:	33.
НОАОН:	53.
COAOHC:	0.0011
COAOC:	0.0030
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.0002
ECHC:	0.000079
NSUCHC:	0.00094
NSUCC:	0.0024
DDCCHC:	0.00023
DDCCC:	0.00061
NSC:	3660
DDCH:	3010
OPT:	30
CHWR:	17
CNWR:	
OAR:	5.6

System Number:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

CWP-1

PREPARED BY: JM

BLDG: 0802	BUILD	ING NAME: BN ADMIN & CL	.RM
SEDO: UUUZ	ENERGY CA	LCULATION SUMMA	RY
			Belle Hill
System Type:	26		
System Name:	Pump		

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	1,094.13	0.00
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.35	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.35	1,232.03	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0 3.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	AO POINTS	DI.	RY AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0802	BUILDING NAME:	BN ADMIN & CLRM	
[	Building UA:	5,781	CONDITIONED SQFT:	12,526

# SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-1

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 7 BRICK AND CMU BATTALION 0700-1800 M-F; SAT Weeks of Winter: 32 Weeks of Summer: 20

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS			
Motor HP:	1.00		
HP Effic:	0.66		
Load Factor:	0.80		
CFM-HTG:	0		
CFM-CLG:	0		
%OA:	0%		
%Агеа:	0%		
CHILLER CAP (TONS):	0		
KW-TON:	0.00		
BLR CAP INPUT (BTUH):	0		
BLR CAP OUTPUT (BTUH):	0		

# HOURS CALCULATIONS

	HR/YR	HR/YR
CLG HRS ON:	940	3,360
HTG HRS ON:	1,504	5,376
H/C HRS ON:	2,451	8,760
CLG HRS SAVED	2,420	- )
HTG HRS SAVED	3,872	Ī
C/H HRS SAVED	6,309	•

	<u>NSTANTS</u>
16	HOAUHC:
26	HOAUH:
0.0002	COAUHC:
0.000	COAUC:
33	HOAOHC:
53	нолон:
0.001	COAOHC:
0.003	COAOC:
0.	DC DUTY:
0.	DC DEMAND:
0.000	ECC:
0.00007	ECHC:
0.0009	NSUCHC:
0.002	NSUCC:
0.0002	DDCCHC:
0.0006	DDCCC:
366	NSC:
301	DDCH:
3	OPT:
17	CHWR:
	CNWR:
5.	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

0802		BN ADMIN & CLRM
ENER	GY CALCULAT	ION SUMMARY

System Type: 26
System Name: Pump
System Number: HWP-1

<u>FUNCTION</u>	<u>kWlyr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	3,501.23	0.00
Opt ST/SP	0.00	275.79	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	3,777.02	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
and Safety Alarms TOTAL	0.00	3,777.02	0.00

	TYPICAL SYSTEN	I POINT A	ND COS	T SUMMA	RY	
UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
nose como como a registra		N			<u> varolivi orporato</u> Primiro policificio i	\$386.00

# BUILDING 804 REGIMENTAL HQ BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0804	BUILDING NAME:	RGT HQ BUILD	
	Building UA:	2,665	CONDITIONED SQFT:	10,241

## SYTEM INFORMATION

System Type: 10 System Name: Multizone air handling unit System Number: AHU-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU		ADMINISTRATION	0600-1700	M-F
Weeks of	f Winter:	32	,		
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	5,575
CFM-CLG:	5,575
%OA:	15%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 940 3,360 HTG HRS ON: 1,504 5,376 H/C HRS ON: 2,451 8,760 CLG HRS SAVED: 2,420 HTG HRS SAVED: 3,872 C/H HRS SAVED: 6,309

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
ноаон:	0
COAOHC:	. 0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

0804

BLDG:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO**: 1406-001 **DATE**: 16-Sep-95

PREPARED BY:

LOCATION: FT. RILEY, KS

BUILDING NAME: RGT HQ BUILD

**ENERGY CALCULATION SUMMARY** 

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-1

MH/yr kWh/yr MBtu/vr **kW/yr** <u>FUNCTION</u> 0.00 0.00 33,983.59 Schedule ST/SP 0.00 0.00 1,642.82 Opt ST/SP 0.00 0.00 0.00 **Duty Cycle** 0.00 0.00 10.99 **Demand Limit** 29.05 0.00 6,190.67 Night Setback 29.05 41,817.08 10.99 Sub Total 0.00 0.00 0.00 **Economizer** 0.00 0.00 0.00 Ventilation/Recirculation 86.61 1,516.56 0.00 **DDC Control** 0.00 0.00 0.00 **HW OA Reset** 0.00 0.00 Chilled Water Reset 0.00 0.00 0.00 0.00 Condenser Water Reset 0.00 0.00 **Chiller Demand Limit** 0.00 5.00 Remote Monitoring,

Maintenance, Run Time, and Safety Alarms

TOTAL 10.99 43,333.64 115.66 5.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMM#	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	8	1	41	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0804	BUILDING NAME:	RGT HQ BUILD

**Building UA:** 2,665

CONDITIONED SQFT:

10,241

# SYTEM INFORMATION

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

# TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	BRICK AND CMU	ADMINISTRATION	0600-1700	M-F

Weeks of Winter: 32 Weeks of Summer: 20

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	17	17	0

0

0

#### **INPUTS** Motor HP: 1.50 **HP Effic:** 0.66 Load Factor: 0.80 CFM-HTG: 0 CFM-CLG: 0 %OA: 0% %Area: 0% CHILLER CAP (TONS): 0 KW-TON: 0.00 BLR CAP INPUT (BTUH):

# HOURS CALCULATIONS

**BLR CAP OUTPUT (BTUH):** 

		PRESENT HR/YR
CLG HRS ON:	940	3,360
HTG HRS ON:	1,504	5,376
H/C HRS ON:	2,451	8,760
CLG HRS SAVED:	2,420	
HTG HRS SAVED:	3,872	
C/H HRS SAVED:	6.309	

HOAUHC:
HOAUH:
COAUHC:
COAUC:
HOAOHC:
HOAOH:
COAOHC:
COAOC:
DC DUTY:
DC DEMAND:
ECC:
ECHC:
NSUCHC:
NSUCC:
DDCCHC:
DDCCC:
NSC:
DDCH:
OPT:
CHWR:
CNWR:
OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

**EMC NO**: 1406-001 **DATE**: 16-Sep-95

PREPARED BY:

0804 BUILDING NAME: RGT HQ BUILD

**ENERGY CALCULATION SUMMARY** 

System Type: 24

BLDG:

System Name: Dual temperature water pump

System Number: DTWP-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	8,557.69	0.00
Opt ST/SP	0.00	413.69	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	2.77	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	2.77	8,971.38	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring,			3.00
and Safety Alarms			0.00
Maintenance, Run Time,	2.77	8,971.38	0.00

UMCS FUNCTA NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	ND COS AO POINTS	T SUMMA  DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
	TOTAL:	1	0	1	4	\$1,418.00

# BUILDING 806 COMBINATION AC-HTG PLANT

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0806	BUILDING NAME:	COMB AC-HTG PLANT	
Building UA:	500	CONDITIONED SQFT:	1,000

#### SYTEM INFORMATION

System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F Weeks of Winter: 32 Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	20.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,600,000
BLR CAP OUTPUT (BTUH):	1,391,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED	: C	- )
HTG HRS SAVED	. 0	I
C/H HRS SAVED:	. 0	- 

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BUILDING NAME: COMB AC-HTG PLANT BLDG: 0806

# ENERGY CALCULATION SUMMARY

System Type:

System Name: Small hot water boiler

System Number: BLR-1

<b>FUNCTION</b>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	4,132.21	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	4,132.21	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	9.07
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.0
TOTAL	0.00	4,132.21	9.07

IMCS INCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	· 0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 **DATE:** 16-Sep-95

1,000

PREPARED BY: LOCATION: FT. RILEY, KS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0806	BILLI DING NAME	COMB AC-HTG PLANT
BLDG.	0000	D012D1110 117 111121	

CONDITIONED SQFT:

**Building UA:** 500

SYTEM INFORMATION

System Type: 1 System Name: Small hot water boiler

System Number: BLR-2

#### TYPICAL BUILDING INFORMATION Occupancy HRS: Occupancy Days: Catagory Number: Construction: M-F 13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800

Weeks of Winter: 20 Weeks of Summer:

# SYSTEM OPERATING SCHEDULE

C video Broke Marie Marie Control Cont	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

INPUTS	
Motor HP:	20.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,600,000
BLR CAP OUTPUT (BTUH):	1,391,000

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	C	)
HTG HRS SAVED	C	)
C/H HRS SAVED:	: C	·· )

ONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG:	0806	BUILDING NAME:	COMB AC-HTG PLANT

	E																	

System Type: 1
System Name: Small hot water boiler
System Number: BLR-2

<u>FUNCTION</u>	- <u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	4,132.21	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	4,132.21	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	9.07
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.0
TOTAL	0.00	4,132.21	9.07

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINT A	ND COS AO POINTS	DI	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	Ó	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY:

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0806	BUILDING NAME:	COMB AC-HTG PLANT	
	Building UA:	500	CONDITIONED SQFT:	1,000

## SYTEM INFORMATION

System Type: 7

System Name: Large air cooled chiller

System Number: CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of V	Winter: 32			
Weeks of Su	immer: 20	•		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24		24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	_24	24

3,360

5,376

8,760

<u>INPUTS</u>	
Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	70
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS REQUIRED HRYR PRESENT HRYR CLG HRS ON: 3,360 3,360 HTG HRS ON: 5,376 5,376 H/C HRS ON: 8,760 8,760

CLG HRS SAVED:	0
HTG HRS SAVED:	0
C/H HRS SAVED:	0

ONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	Ö
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO**: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 0806

BUILDING NAME: COMB AC-HTG PLANT

#### ENERGY CALCULATION SUMMARY

System Type: 7
System Name: Large air cooled chiller

System Number: CH-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	3,149.20	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	7.90	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	7.90	3,149.20	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	1,225.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	58.91	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			6.0
TOTAL	66.80	4,374.20	0.00 6.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
12	Chilled water reset - Large Air Cooled Chiller	0	0	0	4	\$1,133.00
16	Alarms - Chiller	0	0	2	0	\$281.00
43	Chiller demand limiting - Large Air Cooled Chiller	5	0	0	0	\$530.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95 PREPARED BY:

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0806		BUILDING NAME:	COMB AC-HTG PLANT	
	Building UA:		500	CONDITIONED SQFT:	1,000
SVTELL	INCOME TO V				
	IN LEGATOR AND A REPORT	4			
M I CIN	System Type:				
	·	7 Large air cooled	chiller		

TYPICAL BUILDIN	GINFORMATION :		<b>公共报</b>	
Catagory Number: 0	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of W	/inter: 32			
Weeks of Sun	nmer: 20	•		

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: THUR: FRI: SAT: 0 PRES START: 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 REQ START: 0 0 0 0 0 0 0

24

24

24

24

24

24

<u>INPUTS</u>	
Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	70
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

24.

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,36
HTG HRS ON:	5,376	5,37
H/C HRS ON:	8,760	8,76
CLG HRS SAVED:	0	<del>.</del> !
HTG HRS SAVED:	0	ĺ,
C/H HRS SAVED:	0	

· 0
0
0
0
0
0
0
0
0.17
0.17
0
0
0105
0278
0161
0426
4300
0600
305
17.5
0
5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

\ 01-94-D-0033

DATE.

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 0806 BUILDING NAME: COMB AC-HTG PLANT

#### ENERGY CALCULATION SUMMARY

System Type: 7
System Name: Large air cooled chiller

System Number: CH-2

FUNCTION .	<u>kWiyr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	77.13.13.13.13.13.13.13.13.13.13.13.13.13.
Opt ST/SP	0.00	3,149.20	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.90	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	7.90	3,149.20	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,225.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	58.91	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				6.0
TOTAL	66.80	4,374.20	<b>0.00</b>	6.0

IMCS INCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	O	\$386.00
12	Chilled water reset - Large Air Cooled Chiller	0	0	0	4	\$1,133.00
16	Alarms - Chiller	0	0	2	0	\$281.00
43	Chiller demand limiting - Large Air Cooled Chiller	5	0	0	0	\$530.00

# BUILDING 808 BN ADMINISTRATION& CLASSROOM

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0808	BUILDING NAME:	BN ADMIN & CLRM
	Desiletina IIA.	F 704	

Building UA: 5,781 CONDITIONED SQFT:

12,526

#### SYTEM INFORMATION ...

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	17	17	0

30.00

0

# Motor HP:

HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	7,605
CFM-CLG:	7,605
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0

# HOURS CALCULATIONS

**BLR CAP OUTPUT (BTUH):** 

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	940	3,360
HTG HRS ON:	1,504	5,376
H/C HRS ON:	2,451	8,760
CLG HRS SAVED:	2,420	- !'
HTG HRS SAVED:	3,872	<del>.</del>
C/H HRS SAVED:	6,309	•

# <u>CONSTANTS</u>

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	<b>5</b> 3.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM

BLDG: 0808 BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
0.00	131,523.17	77.73	
0.00	6,298.41	0.00	
0.00	0.00	0.00	
42.13	0.00	0.00	
0.00	45,151.17	211.58	
42.13	182,972.75	289.32	
0.00	1,481.70	0.00	
0.00	59.61	3.76	
0.00	4,342.58	174.01	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			5.00
	0.00 0.00 0.00 42.13 0.00 42.13 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	0.00         131,523.17           0.00         6,298.41           0.00         0.00           42.13         0.00           0.00         45,151.17           42.13         182,972.75           0.00         1,481.70           0.00         59.61           0.00         4,342.58           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         131,523.17         77.73           0.00         6,298.41         0.00           0.00         0.00         0.00           42.13         0.00         0.00           0.00         45,151.17         211.58           42.13         182,972.75         289.32           0.00         1,481.70         0.00           0.00         59.61         3.76           0.00         4,342.58         174.01           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	. 1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #:** DACA 01-94-D-0033

**EMC NO:** 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

System Number: CWP-1

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0808	BUILDING NAME:	BN ADMIN & CLRM	
	Building UA:	5,781	CONDITIONED SQFT:	12,526
SYTEM	INFORMATION			
Break Committee Committee	System Type: 26			
	System Name: Pump			

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of	Winter:	32		

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7	8	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	940	3,360
HTG HRS ON:	1,504	5,376
H/C HRS ON:	2,451	8,760
CLG HRS SAVED:	2,420	<del>.</del> I
HTG HRS SAVED:	3,872	•
C/H HRS SAVED:	6,309	

<u>CONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0808 BUILDING NAME: BN ADMIN & CLRM

#### **ENERGY CALCULATION SUMMARY**

System Type: 26
System Name: Pump
System Number: CWP-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	1,094.13	0.00
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.35	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.35	1,232.03	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.35	1,232.03	3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	ND COST AO POINTS	М	RY	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0		0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

### **ENERGY CALCULATION PARAMETERS**

BLDG: 0808 BUILDING NAME: BN ADMIN & CLF	M
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Use:

**BATTALION** 

5,781 **Building UA:** 

CONDITIONED SQFT:

Occupancy HRS:

0700-1800

12,526

Occupancy Days

M-F; SAT

#### SYTEM INFORMATION ...

System Type: 26 System Name: Pump System Number: HWP-1

#### TYPICAL BUILDING INFORMATION

Catagory Number: Construction: **7 BRICK AND CMU** 

Weeks of Winter: 32 20 Weeks of Summer:

#### SYSTEM OPERATING SCHEDULE

Approxitation of a second	ŚUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:		0:	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	7	8	7.	8	0
REQ STOP:	0	17	17	17	17	17	0

#### **INPUTS** 1.00 Motor HP: HP Effic: 0.66 0.80 Load Factor: 0 CFM-HTG: 0 CFM-CLG: 0% %OA: 0% %Area: CHILLER CAP (TONS): 0 0.00 KW-TON: 0 BLR CAP INPUT (BTUH): 0

#### **HOURS CALCULATIONS**

BLR CAP OUTPUT (BTUH):

		PRESENT HR/YR
CLG HRS ON:	940	3,360
HTG HRS ON	1,504	5,376
H/C HRS ON	2,451	8,760
CLG HRS SAVED	2,420	
HTG HRS SAVED	3,872	
C/H HRS SAVED	6,309	Ì

<u>CONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0808	BUILDING	NAME:	BN ADMIN	& CLRM
	ENERGY CAL	CULAT	ION SUM	MARY
System Type:	26			
System Name:	Pump			
System Number:	HWP-1			!

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	3,501.23	0.00
0.00	275.79	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	3,777.02	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		3.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         3,501.23           0.00         275.79           0.00         0.00           0.00         0.00           0.00         0.00           0.00         3,777.02           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS	TYPICAL SYSTEM					
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	<u>1</u>	0	\$386.00
	TOTAL:	7	0	1	0	\$386.00

### BUILDING 810 ADMINISTRATION& SUPPLY BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/AMS/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0810	BUILDING NAME	: ADMIN & SUPPLY BLDG	
	Building UA:	4,538	CONDITIONED SQFT:	151,520

#### SYTEM INFORMATION

System Type: 26
System Name: Pump
System Number: CWP-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32		
Weeks of S		32		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	7	6	7	6	0
REQ STOP:	0	20	19	20	19	20	0

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,320 3,360 HTG HRS ON: 5,376 2,112 H/C HRS ON: 3,441 8,760 CLG HRS SAVED: 2,040 HTG HRS SAVED: 3,264 C/H HRS SAVED: 5,319

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	. 0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/CWW

BLDG: 0810 BUILDING NAME: ADMIN & SUPPLY BLDG

ENERGY CALCULATION SUMMARY

 System Type:
 26

 System Name:
 Pump

 System Number:
 CWP-1

<b>FUNCTION</b>	kW/yr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	4,623.31	0.00
Opt ST/SP	0.00	691.23	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.73	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	1.73	5,314.54	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	1.73	5,314.54	0.00 3.00

UMCS FUNCTI NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	ÃO	<b>DI</b> *	RY AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump;	1	0	1	0	\$386.00
	Demand limiting - Pump					
	TOTAL:	1	0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #:** DACA 01-94-D-0033

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0810	BUILDING NAME:	ADMIN & SUPPLY BLDG	
	Building UA:	4,538	CONDITIONED SQFT:	151,520

# SYTEM INFORMATION ...

System Type: 24 System Name: Dual temperature water pump

System Number: DTWP-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	٠. ٥	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	7	6	7	6	0
REQ STOP:	0	20	19	20	19	20	0

Motor HP:	5.00
HP Effic:	0.73
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### REQUIRED PRESENT HR/YR CLG HRS ON: 1,320 3,360 HTG HRS ON: 2,112 5,376 H/C HRS ON: 3,441 8,760

CLG HRS SAVED:	2,040
HTG HRS SAVED:	3,264
C/H HRS SAVED:	5,319

HOURS CALCULATIONS

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/AMS/CWW

BUILDING NAME: ADMIN & SUPPLY BLDG BLDG: 0810 ENERGY CALCULATION SUMMARY

System Type: Dual temperature water pump System Name:

DTWP-1 System Number:

FUNCTION	kW/yr	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	21,800.30	0.00
Opt ST/SP	0.00	1,250.16	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	8.36	0.00	0.00
Night Setback	0.00	. 0.00	0.00
Sub Total	8.36	23,050.46	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring,			3
Maintenance, Run Time, and Safety Alarms			0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW	1	0	1	4	\$1,418.00
	Pump; Night setback - DTW Pump  TOTAL:	1	Species Solito V. 1. 14. 186		4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0810 BUILDING NAME: ADMIN & SU
--------------------------------------

**Building UA:** 4,538 CONDITIONED SQFT: 151,520

#### SYTEM INFORMATION

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-2

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:		Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN	& SUPPLY	0700-1600	M-F
Weeks o	of Winter:	32	•		

Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6		6	7	6	0
REQ STOP:	0	20	19	20	19	20	0

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area	n%

U	CFM-HTG:
0	CFM-CLG:
0%	%OA:
0%	%Area:
0	CHILLER CAP (TONS):
0.00	KW-TON:
0	BLR CAP INPUT (BTUH):
0	BLR CAP OUTPUT (BTUH):

#### **HOURS CALCULATIONS**

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	1,320	3,360
HTG HRS ON	2,112	5,376
H/C HRS ON	3,441	8,760
CLG HRS SAVED	2,040	- )
HTG HRS SAVED	3,264	- ·
C/H HRS SAVED	5,319	i i

#### CONSTANTS

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/CWW

BLDG:	0810	BUILDING NAME:	ADMIN & SUPPLY BLDG

ENERGY CALCULATION SUMMARY
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System Type: 24
System Name: Dual temperature water pump
System Number: DTWP-2

FUNCTION -	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/y	<b>I</b>
Schedule ST/SP	0.00	12,053.63	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	4.62	12,744.86	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	12,744.86	0.00	3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	POINT A  DO POINTS	AND COS AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	O	1	4	\$1,418.00
	TOTAL	1	0	1	4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

EMC NO: 1406-001 **DATE:** 16-Sep-95

PREPARED BY: AJN/AMS/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0810	BUILDING NAME:	ADMIN & SUPPLY BLDG	
	Building UA:	4,538	CONDITIONED SQFT:	151,520

#### SYTEM INFORMATION

System Type: 19

System Name: Fan coil unit

System Number: FC-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

32 Weeks of Winter: 20 Weeks of Summer:

#### SYSTEM OPERATING SCHEDULE

030 00000	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	= · · · · · · · · 7	6	7	6	0
REQ STOP:	0	20	19	20	19	20	0

<u>NPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	8,000
CFM-CLG:	8,000
%OA:	15%
%Area:	37%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,320	3,360
HTG HRS ON:	2,112	5,376
H/C HRS ON:	3,441	8,760
CLG HRS SAVED	2,040	1
HTG HRS SAVED	3,264	-
C/H HRS SAVED	5,319	- )

HOALING	
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
нолонс:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/AMS/CWW

BLDG: 0810 BUILDING NAME: ADMIN & SUPPLY BLDG

#### ENERGY CALCULATION SUMMARY

System Type:	19	
System Name:	Fan coil unit	
System Number:	FC-1	
EUNCTION	kWhar kWhar	
TORGINE	<u> </u>	

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	4,586.88	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	9,615.98	155.48	
Sub Total	0.00	14,465.90	155.48	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	14,465.90	155.48	0.00

UMCS	TYPICAL SYSTEM	POINT A	IND COS	T SUMMA	(RY	
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	<b>- 1</b>	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

System Number: HV-1

PREPARED BY: AJN/AMS/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0810	BUILDING NAME: ADMIN & SUPPLY BLDG					
Building UA:	4,538	CONDITIONED SQFT:	151,520			
YTEM INFORMATION		Section 1981				
System Type: 1						
System Name:	leating and Ventilating Unit					

Catagory Number:	Construction:	<del></del>	Use:	Occupancy HRS:	Occupancy Days:
Catagory Ivamber.	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32	•		
Weeks of S	Summer:	20			

SYSTEM OPERA	TING S	CHEDUL	<b>.</b>			- <u></u> -	
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAI:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	7.	6	7	6	0
REQ STOP:	0	20	19	20	19	20	0

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		3,360
HTG HRS ON:	2,112	5,376
H/C HRS ON:	3,441	8,760
CLG HRS SAVED:	2,040	)
HTG HRS SAVED:	3,264	Ī.
C/H HRS SAVED:	5,319	Đ

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

PREPARED BY: AJN/AMS/CWW

BLDG: 0810

BUILDING NAME: ADMIN & SUPPLY BLDG

#### ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-1

FUNCTION .	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	2,814.96	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	66.75	
Sub Total	0.00	3,078.00	66.75	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	21.44	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0810	BUILDING NAME:	ADMIN & SUPPLY BLDG	
	Building UA:	4,538	CONDITIONED SQFT:	151,520

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-2

TYPICAL BUILD	ing informa	TION	1964 1984		
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	J	ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	. 0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0.	6	7	6	7	6	0
REQ STOP:	0	20	19	20	19	20	0

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,320	3,360
HTG HRS ON:	2,112	5,376
H/C HRS ON:	3,441	8,760
CLG HRS SAVED:	2,040	 !
HTG HRS SAVED:	3,264	•
C/H HRS SAVED:	5,319	

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
НОАОНС:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS/CWW

BLDG: 0810 BUILDING NAME: ADMIN & SUPPLY BLDG

**ENERGY CALCULATION SUMMARY** 

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-2

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	2,814.96	0.00
0.00	263.04	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	66.75
0.00	3,078.00	66.75
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	21.44
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		3.0 88.19
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         263.04           0.00         0.00           0.00         0.00           0.00         0.00           0.00         3,078.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/CWW

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0810	BUILDING NAME:	ADMIN & SUPPLY BLDG

**Building UA:** 4,538

151,520 CONDITIONED SQFT:

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit System Number: HV-3

#### TYPICAL BUILDING INFORMATION

Occupancy Days: Use: Occupancy HRS: Catagory Number: Construction: **ADMIN & SUPPLY** 0700-1600 3 BRICK AND CMU

32 Weeks of Winter: 20 Weeks of Summer:

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	7	6	7	6	0
REQ STOP:	0	20	19	20	19	20	0

1.00	Motor HP:
0.69	HP Effic:
0.80	Load Factor:
2,400	CFM-HTG:
C	CFM-CLG:
100%	%OA:
16%	%Area:
(	CHILLER CAP (TONS):
0.00	KW-TON:
(	BLR CAP INPUT (BTUH):
(	BLR CAP OUTPUT (BTUH):

#### HOURS CALCULATIONS

		<u>ESENT</u> /YR
CLG HRS ON:	1,320	3,360
HTG HRS ON:	2,112	5,376
H/C HRS ON:	3,441	8,760
CLG HRS SAVED	2,040	
HTG HRS SAVED	3,264	
C/H HRS SAVED	5,319	

<u>NSTANTS</u>	
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
НОАОНС:	0
ноаон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	O
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/AMS/CWW

BLDG: 0810 BUILDING NAME: ADMIN & SUPPLY BLDG

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-3

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yt</u>
Schedule ST/SP	0.00	2,814.96	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	66.75	
Sub Total	0.00	3,078.00	66.75	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	21.44	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0810	BUILDING NAME:	ADMIN & SUPPLY BLDG	>
1	Building UA:	4,538	CONDITIONED SQFT:	151,520

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-4

TYPICAL BUILD	ING INFORMATIO	N			
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks o	of Winter:	32			
Weeks of	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	7	6	7	6	0
REQ STOP:	0	20	19	20	19	20	0

	ALEMANDAMAN INCAMA AND AND A
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,320 3,360 5,376 HTG HRS ON: 2,112 H/C HRS ON: 8,760 3,441 CLG HRS SAVED: 2,040 HTG HRS SAVED: 3,264 C/H HRS SAVED: 5,319

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/AMS/CWW

BLDG: 0810 BUILDING NAME: ADMIN & SUPPLY BLDG

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-4

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	2,814.96	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	66.75	
Sub Total	0.00	3,078.00	66.75	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	21.44	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,078.00	88.19	3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

# BUILDING 812 ADMINISTRATION& SUPPLY BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0812	BUILDING NAME:	ADMIN & SUPPORT BLDG	
	Building UA:	7,056	CONDITIONED SQFT:	23,559

#### SYTEM INFORMATION - Property

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
		——————————————————————————————————————		

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	17	17	0

<u>inputs</u>	
Motor HP:	3.00
HP Effic:	0.72
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	-
C/H HRS SAVED:	6,466	-

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67
The second of th	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95 PREPARED BY: JM/AMS/AJN

BUILDING NAME: ADMIN & SUPPORT BLDG BLDG: 0812

ENERGY CALCULATION SUMMARY

System Type:

Dual temperature water pump System Name:

DTWP-1 System Number:

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	16,190.51	0.00
Opt ST/SP	0.00	763.74	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	5.11	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	5.11	16,954.25	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	. 0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
and Safety Alarms TOTAL	5.11	16,954.25	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	AND COS AO POINTS	T SUMMA DI POINTS	ARY  AI  POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
	TOTAL:	1	0	1	4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0812	BUILDING NAME:	ADMIN & SUPPORT BLDG

**Building UA:** 7,056 CONDITIONED SQFT: 23,559

#### SYTEM INFORMATION

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-2

#### TYPICAL BUILDING INFORMATION

Construction: Catagory Number: Use: Occupancy HRS: Occupancy Days: 3 BRICK AND CMU ADMIN & SUPPLY 0700-1600 M-F

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	. 0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	17	17	0

#### **INPUTS** Motor HP: 3.00 HP Effic: 0.79 0.80 Load Factor: 0 CFM-HTG: 0 CFM-CLG: 0% %OA: 0% %Area: **CHILLER CAP (TONS):** 0 0.00 KW-TON: **BLR CAP INPUT (BTUH):** 0 **BLR CAP OUTPUT (BTUH):** 0

#### HOURS CALCULATIONS

	PRESENT HR/YR
880	3,360
1,408	5,376
2,294	8,760
2,480	
3,968	-
6,466	;
	HR/YR 880 1,408 2,294 2,480 3,968

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95 PREPARED BY: JM/AMS/AJN

BUILDING NAME: ADMIN & SUPPORT BLDG BLDG: 0812

ENERGY CALCULATION SUMMARY

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-2

<u>FUNCTION</u>	kW/yr	- <u>kWh/yr</u>	MBtulyr MH/vr
Schedule ST/SP	0.00	14,653.44	0.00
Opt ST/SP	0.00	691.23	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	4.62	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	4.62	15,344.67	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	4.62	15,344.67	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AND COS AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
	TOTAL:	1	0	1	4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AMS/AJN

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0812	<b>BUILDING NAME:</b>	ADMIN & SUPPORT BLDG
DLOU.	00.2	··· -	

Building UA: 7,056

CONDITIONED SQFT:

23,559

#### SYTEM INFORMATION

System Type: 19

System Name: Fan coil unit

System Number: FC-1

YPICAL BUILD Catagory Number:	ING INFORMATIO  Construction:	N :	Use:	Occupancy HRS:	Occupancy Days:
Catagory Number.	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

December 1 - 1994 - Application 120 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	9,000
CFM-CLG:	1,800
%OA:	10%
%Area:	37%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR 3,360 CLG HRS ON: 880 5,376 HTG HRS ON: 1,408 8,760 2,294 H/C HRS ON: CLG HRS SAVED: 2,480 3,968 HTG HRS SAVED: C/H HRS SAVED: 6,466

<u>CONSTANTS</u>	•
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

BLDG:		BUILDING NAME:			
	ENER	SY CALCULAT	ION SUM	MARY.	

System Type: 19

System Name: Fan coil unit
System Number: FC-1

MH/vr **FUNCTION** kW/yr <u>kWh/yr</u> MBtu/yr Schedule ST/SP 0.00 5,576.21 0.00 0.00 Opt ST/SP 0.00 263.04 **Duty Cycle** 0.00 0.00 0.00 0.00 0.00 0.00 **Demand Limit** 243.06 0.00 2,630.25 Night Setback 243.06 **Sub Total** 0.00 8,469.50 **Economizer** 0.00 0.00 0.00 0.00 0.00 0.00 Ventilation/Recirculation 0.00 0.00 0.00 **DDC Control** 0.00 0.00 **HW OA Reset** 0.00 0.00 **Chilled Water Reset** 0.00 0.00 0.00 0.00 0.00 Condenser Water Reset 0.00 0.00 0.00 **Chiller Demand Limit** 0.00 Remote Monitoring, Maintenance, Run Time, and Safety Alarms 0.00 8,469.50 243.06 0.00 TOTAL

UMCS FUNCTN NO.	TYPICAL SYSTEN  UMCS APPLICATION	POINT A DO POINTS	AO POINTS	DI	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1.2	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95

PREPARED BY: JM/AMS/AJN

EMC NO: 1406-001

#### **ENERGY CALCULATION PARAMETERS**

BUILDING NAME: ADMIN & SUPPORT BLDG BLDG: 0812

> 7,056 **Building UA:**

CONDITIONED SQFT:

23,559

SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks of	Winter:	32			
Weeks of S	lummer:	20			

#### SYSTEM OPERATING SCHEDULE

Section 4) commission and the commission of the	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	. 0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,820
CFM-CLG:	0
%OA:	100%
%Агеа:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

### HOURS CALCULATIONS

	PRESENT HR/YR
880	3,360
1,408	5,376
2,294	8,760
2,480	
3,968	•
6,466	
	880 1,408 2,294 2,480

<u>ONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AMS/AJN

BLDG: 0812 BUILDING NAME: ADMIN & SUPPORT BLDG

**ENERGY CALCULATION SUMMARY** 

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-1

<u>FUNCTION</u>	kW/yr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	4,800.21	0.00
Opt ST/SP	0.00	368.97	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	82.77
Sub Total	0.00	5,169.18	82.77
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	26.58
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	5,169.18	109.35 3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0812	BUILDING NAME:	ADMIN & SUPPORT BLDG	
	Building UA:	7,056	CONDITIONED SQFT:	23,559

# SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-2

TYPICAL BUILD	ING INFORMATIC	<u> M</u>			
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	17	17	0

<u>NPUTS</u>			
Motor HP:	1.50		
HP Effic:	0.74		
Load Factor:	0.80		
CFM-HTG:	2,820		
CFM-CLG:	0		
%OA:	100%		
%Area:	13%		
CHILLER CAP (TONS):	0		
KW-TON:	0.00		
BLR CAP INPUT (BTUH):	0		
BLR CAP OUTPUT (BTUH):	0		

# HOURS CALCULATIONS

<u>QUIRED</u> <u>PRE</u> YR <u>HR/</u>	<u>SENT</u> YR
880	3,360
1,408	5,376
2,294	8,760
2,480	
3,968	
6,466	
	YR 880 1,408 2,294 2,480 3,968

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM/AMS/AJN

BLDG: 0812 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-2

· kW/yr	<u>kWh/yr</u>	MBtu/yr	MH/yr
0.00	7,821.77	0.00	
0.00	368.97	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	82.77	
0.00	8,190.73	82.77	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	26.58	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         7,821.77           0.00         368.97           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         7,821.77         0.00           0.00         368.97         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         82.77           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO - POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0812	<b>BUILDING NAME:</b>	ADMIN & SUPPORT BLDG
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Building UA: 7,056 CONDITIONED SQFT: 23,559

SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-3

#### TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 3BRICK AND CMU ADMIN & SUPPLY 0700-1600 M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

TUE: SUN: MON: WED: THUR: FRI: SAT: PRES START: 0 0 0 0 0 24 PRES STOP: 24 24 24 24 24 24 **REQ START:** 0 9 7 9 9 0 17 17 **REQ STOP:** 0 17 17 17

#### **INPUTS** 1.50 Motor HP: **HP Effic:** 0.74 0.80 Load Factor: CFM-HTG: 2,820 CFM-CLG: 0 100% %OA: 13% %Area: 0 CHILLER CAP (TONS): KW-TON: 0.00

BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0
#TOTALIA AT 18 12 TOTALIA AT 18 TOTALIA AT 1	Parameter State Committee
MOUDO ON OUR ETIONS	

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	1
C/H HRS SAVED:	6,466	:

	<u>CONSTANTS</u>
0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	ноаон:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0.000226	NSUCHC:
0.000598	NSUCC:
0.0000188	DDCCHC:
0.0000498	DDCCC:
93100	NSC:
29900	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AMS/AJN

BLDG: 0812 BUILDING NAME: ADMIN & SUPPORT BLDG

# ENERGY CALCULATION SUMMARY

System Type: '16
System Name: Heating and Ventilating Unit
System Number: HV-3

<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr	
0.00	7,821.77	0.00	
0.00	368.97	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	82.77	
0.00	8,190.73	82.77	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	26.58	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         7,821.77           0.00         368.97           0.00         0.00           0.00         0.00           0.00         0.00           0.00         8,190.73           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         7,821.77         0.00           0.00         368.97         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         82.77           0.00         8,190.73         82.77           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0812	BUILDING NAME:	ADMIN & SUPPORT BLDG

Building UA: 7,056 CONDITIONED SQFT: 23,559

# SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-4

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 3 BRICK AND CMU ADMIN & SUPPLY 0700-1600 M-F Weeks of Winter: 32

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,820
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	i

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

BLDG: 0812

BUILDING NAME: ADMIN & SUPPORT BLDG

## **ENERGY CALCULATION SUMMARY**

System Type: System Name:

Heating and Ventilating Unit

System Number:

HV-4

FUNCTION .	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	7,821.77	0.00
Opt ST/SP	0.00	368.97	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	82.77
Sub Total	0.00	8,190.73	82.77
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	26.58
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.00	8,190.73	109.35

UMCS UNCTN NO.	UMCS APPLICATION	_DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

EMC NO: 1406-001 **DATE**: 16-Sep-95

PREPARED BY: JM/AMS/AJN

# **ENERGY CALCULATION PARAMETERS**

		51111 51116 11115	
BLDG:	0812	BUILDING NAME:	ADMIN & SUPPORT BLDG

**Building UA:** 7,056

CONDITIONED SQFT:

23,559

# SYTEM INFORMATION:

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-5

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Occupancy HRS: Occupancy Days: 3 BRICK AND CMU ADMIN & SUPPLY 0700-1600 M-F Weeks of Winter: 32

#### SYSTEM OPERATING SCHEDULE

Weeks of Summer:

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	17	17	0

20

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,820
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLD CAD OUTDUT (BTUH).	

#### PRESENT REQUIRED HR/YR HR/YR CLG HRS ON: 880 3,360 HTG HRS ON: 1,408 5,376 H/C HRS ON: 2,294 8,760 CLG HRS SAVED: 2.480 HTG HRS SAVED: 3,968

6,466

HOURS CALCULATIONS

C/H HRS SAVED:

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: JM/AMS/AJN

**DATE:** 16-Sep-95

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-5

BLDG: 0812

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	7,821.77	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	82.77	
Sub Total	0.00	8,190.73	82.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	26.58	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				, 3.00
TOTAL	0.00	8,190.73	109.35	3.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

# BUILDING 814 MEDICAL FACILITY - NEW

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0814	BUILDING NAME:	MEDICAL FAC - NEW	
	Building UA:	1 449	CONDITIONED SOFT:	9 220

# SYTEM INFORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	0 BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F
Weeks of	Winter:	32		
Weeks of S	lummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	15	15	15	15	15	0

<u>inputs</u>	
Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	5,000
CFM-CLG:	5,000
%OA:	30%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

## HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	, )
HTG HRS SAVED:	3,936	 
C/H HRS SAVED:	6,414	•

<u>ONSTANTS</u>	
HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
НОАОН:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: JM/AJN/AMS

BLDG: 0814 BUILDING NAME: MEDICAL FAC - NEW

ENERGY CALCULATION SUMMARY

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	46,185.93	482.94	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	4,585.70	18.26	
Sub Total	10.99	52,414.45	501.20	
Economizer	0.00	3,660.43	0.00	
Ventilation/Recirculation	0.00	553.57	22.97	
DDC Control	0.00	1,396.12	20.44	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
The state of the s				5.0
Maintenance, Run Time, and Safety Alarms TOTAL	10.99	58,024.58	544.60	

TYPICAL SYSTEM POINT AND COST SUMMARY UMCS						
TUNCEN NO.	UMCS APPLICATION	DO - POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	.1	8	1	11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0814	BUILDING NAME	: MEDICAL FAC - NEW

Building UA: 1,449

CONDITIONED SQFT: 9,2

9,220

## SYTEM INFORMATION .

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

TYPICAL BUILD	ING INFORMATIO	N E			
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1	0 BRICK AND CMU		DENTAL CLINIC	0800-1700	M-F
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	15	15	15	15	15	0

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	65%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	707,500
BLR CAP OUTPUT (BTUH):	566,000

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	- !
HTG HRS SAVED:	3,936	-   
C/H HRS SAVED:	6,414	-

<u> NSTANTS</u>	
HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
НОАОН:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 0814

BUILDING NAME: MEDICAL FAC - NEW

# ENERGY CALCULATION SUMMARY

| System Type: 1 | System Name: Small hot water boiler

System Number: BLR-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,023.09	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,489.82	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	4.01	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	6,489.82	4.01	. 4.00

UMCS	TYPICAL SYSTEM	POINT A	ND COS	T SUMM/	ARY	Tillians St. American
FUNCTN NO:	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI _ POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	O	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2		\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0814	BUILDING NAME: ME	EDICAL FAC - NEW
			ACMINITIONED COFT.

Building UA: 1,449

CONDITIONED SQFT: 9,220

## SYTEM INFORMATION ...

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

#### TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:

10 BRICK AND CMU DENTAL CLINIC 0800-1700 M-F

Weeks of Winter: 32
Weeks of Summer: 20

# SYSTEM OPERATING SCHEDULE

SAT: SUN: MON: TUE: WED: FRI: 0 0 0 0 0 0 PRES START: 24 24 24 PRES STOP: 24 24: 24 0 6 6 **REQ START:** 6 6 6 15 15 15 15 15 **REQ STOP:** 

# INPUTS Make UP.

Motor HP:	2.00
HP Effic:	0.71
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	20
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLD CAD OUTDUT (RTUH)	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	•
HTG HRS SAVED:	3,936	5
C/H HRS SAVED:	6,414	

# CONSTANTS

HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	C
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 **DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BUILDING NAME: MEDICAL FAC - NEW BLDG: 0814 

ENERGY CALCULATION SUMMARY

6 System Type: Small air cooled chiller System Name:

CH-1 System Number:

FUNCTION	kW/yr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	4,135.57	0.00
Opt ST/SP	0.00	512.74	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.29	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	1.29	4,648.32	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	350.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	16.83	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.00
TOTAL	18.12	4,998.32	0.00 4.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

9,220

LOCATION: FT. RILEY, KS

System Number: CWP-1

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0814	BUILDING NAME:	MEDICAL FAC - NEW	
	Building UA:	1,449	CONDITIONED SQFT:	

# SYTEM INFORMATION System Type: 26 System Name: Pump

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days
	0 BRICK AND CMU		DENTAL CLINIC	0800-1700	M-F
Weeks of	Winter:	32			
Weeks of Weeks of S		32:			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	15	15	15	15	15	0

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	C

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	)
HTG HRS SAVED:	3,936	<u>,</u>
C/H HRS SAVED:	6,414	-

ONSTANTS	
HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
HOAOH:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BUILDING NAME: MEDICAL FAC - NEW BLDG: 0814 ENERGY CALCULATION SUMMARY

System Type: 26 System Name: Pump CWP-1 System Number:

<u>FUNCTION</u>	<u>kWiyr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	3,764.43	0.00
Opt ST/SP	0.00	466.73	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.17	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	1.17	4,231.16	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	1.17	4,231,16	0.00 3.00

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	RY	
UMCS FUNCTN	UMCS APPLICATION	DO -	AO	DI	ΑĪ	COST
NO.		POINTS	POINTS	POINTS	POINTS	
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:		0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0814	BUILDING NAME:	MEDICAL FAC - NEW	
Building UA:	1,449	CONDITIONED SQFT:	9,220

#### SYTEM INFORMATION

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1	0 BRICK AND CMU		DENTAL CLINIC	0800-1700	M-F
Weeks of	Winter:	32			
Weeks of Summer: 20		20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	15	15	15	15	15	0

<u>inputs</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	65%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### **HOURS CALCULATIONS** REQUIRED PRESENT HR/YR HR/YR 3,360 CLG HRS ON: 900 HTG HRS ON: 1,440 5,376 H/C HRS ON: 2,346 8,760 CLG HRS SAVED: 2.460 HTG HRS SAVED: 3,936 C/H HRS SAVED: 6,414

<u>ONSTANTS</u>	
HOAUHC:	50.
HOAUH:	80.
COAUHC:	0.0012
COAUC:	0.003
НОАОНС:	45.
HOAOH:	72.
COAOHC:	0.001
COAOC:	0.004
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00082
ECHC:	0.00031
NSUCHC:	0.00014
NSUCC:	0.00037
DDCCHC:	0.00011
DDCCC:	0.00031
NSC:	3600
DDCH:	4030
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95 PREPARED BY: JM/AJN/AMS LOCATION: FT. RILEY, KS

EMC NO: 1406-001

BUILDING NAME: MEDICAL FAC - NEW BLDG: 0814 

ENERGY CALCULATION SUMMARY

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	6,023.09	0.00
Opt ST/SP	0.00	466.73	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	6,489.82	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.00	6,489.82	0.00 * 3.00

	TYPICAL SYSTEM	A POINT A	ND COS	TSUMM	ARY	
UMCS FUNCTI	UMCS APPLICATION	DO	AO	DI	ΑI	COST
NO.		POINTS	POINTS	POINTS	POINTS	
23	Scheduled start/stop control - HW	1	0	1	1	\$570.00
	Pump; Optimum start/stop - HW Pump; Night setback - HW Pump					
	TOTAL	1	0	1	1	\$570.00

# BUILDING 817 MAINTENANCE HANGAR AVUM

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

RILEY, KS

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

PREPARED BY:

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0817	BUILDING NAME:	MNT HANGAR AVUM	
	Building UA:	9,255	CONDITIONED SQFT:	40,061

# SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
l l	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32	•	
Weeks of S	Summer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:		THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	7	6	7	6	0
REQ STOP:	0	17	17	17	15	17	0

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,330
CFM-CLG:	1,330
%OA:	15%
%Area:	2%
CHILLER CAP (TONS):	(
KW-TON:	0.00
BLR CAP INPUT (BTUH):	(
BLR CAP OUTPUT (BTUH):	(

# HOURS CALCULATIONS

		QUIRED VYR	PRESEN HR/YR	<u>IT</u>
CLG H	RS ON:	1,02	0	3,360
HTG HI	RS ON:	1,63	2	5,376
H/C H	RS ON:	2,65	9	8,760
CLG HRS S	AVED:	2,34	0	
HTG HRS S	AVED:	3,74	4	
C/H HRS S	AVED:	6,10	1	

<u>ISTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.0
нолон:	53.5
COAOHC:	0.0011
COAOC:	0.0030
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.0002
ECHC:	0.000079
NSUCHC:	0.00094
NSUCC:	0.0024
DDCCHC:	0.00023
DDCCC:	0.00061
NSC:	3660
DDCH:	3010
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 0817 BUILDING NAME: MNT HANGAR AVUM

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

FUNCTION	<u>kWlyr si</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	3,071.06	19.72	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.92	0.00	0.00	
Night Setback	0.00	7,635.23	6.77	
Sub Total	0.92	10,844.18	26.49	
Economizer	0.00	281.18	0.00	
Ventilation/Recirculation	0.00	15.64	0.99	
DDC Control	0.00	824.09	5.57	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0817	<b>BUILDING NAME:</b>	MNT HANGAR AVUM

Building UA: 9,255 CONDITIONED SQFT: 40,061

SYTEM INFORMATION ...

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 7BRICK AND CMU BATTALION 0700-1800 M-F; SAT

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

SUN: MON: TUE: THUR: WED: FRI: PRES START: 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 **REQ START:** 0 6 7 6 7 0 6 **REQ STOP:** 0 17 17 17 15 17 0

INPUTS
Motor HP:

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,200
CFM-CLG:	1,200
%OA:	15%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOH				
771 71 1	<b>T.</b> T. I	2046 . J. 1921	 A 400 M	H 11N.7

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,020	3,360
HTG HRS ON:	1,632	5,376
H/C HRS ON:	2,659	8,760
CLG HRS SAVED:	2,340	<del>.</del>
HTG HRS SAVED:	3,744	
C/H HRS SAVED:	6,101	-

#### CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY:

BLDG: 0817

BUILDING NAME: MNT HANGAR AVUM

# ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

<u>Function</u>	kW/yr	<u>kWh/yr</u>	<u>MBtu/yr</u> MH/yr
Schedule ST/SP	0.00	3,040.48	17.79
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.92	0.00	0.00
Night Setback	0.00	6,888.93	6.77
Sub Total	0.92	10,067.30	24.56
Economizer	0.00	253.70	0.00
Ventilation/Recirculation	0.00	14.11	0.89
DDC Control	0.00	743.54	5.57
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3
TOTAL	0.92	11,078.65	31.03

	TYPICAL SYSTEM	POINT A	ND COS	T SUMM#	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	-DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:		3	O	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0817	BUILDING NAME:	MNT HANGAR AVUM

Building UA: 9,255

CONDITIONED SQFT:

40,061

## SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F SAT

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	7	6	7	6	0
REQ STOP:	0	17	17	17	15	17	0

# INPUTS MARKET

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	2,400
%ÔA:	15%
%Area:	3%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	HR/YR	PRESENT HR/YR
CLG HRS ON:	1,020	3,360
HTG HRS ON:	1,632	5,376
H/C HRS ON:	2,659	8,760
CLG HRS SAVED:	2,340	-
HTG HRS SAVED:	3,744	
C/H HRS SAVED:	6,101	-

## CONSTANTS

DONO (ANTO	
HOAUHC	: 16.2
HOAUH	: 26.1
COAUHC	: 0.000257
COAUC	: 0.00068
НОАОНС	: 33.3
НОАОН	: 53.5
COAOHC	: 0.00115
COAOC	0.00305
DC DUTY	: 0.17
DC DEMAND	: 0.17
ECC	0.00021
ECHC	: 0.0000795
NSUCHC	0.000941
NSUCC	0.00249
DDCCHC	0.000233
DDCCC	0.000616
NSC	36600
DDCH	30100
OPT	305
CHWR	17.5
CNWR	: 0
OAR	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 0817 BUILDING NAME: MNT HANGAR AVUM 

**ENERGY CALCULATION SUMMARY** 

System Type:

System Name: Small Single Zone air handling unit

AHU-3 System Number:

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	7,944.65	35.58	300 - 10 - 10 - 10 - 10 - 10 - 10 - 10 -
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	13,777.85	10.16	
Sub Total	2.47	22,091.47	45.74	
Economizer	0.00	507.39	0.00	
/entilation/Recirculation	0.00	28.22	1.78	
DDC Control	0.00	1,487.07	8.36	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		4 - 100		3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0817 **BUILDING NAME: MNT HANGAR AVUM** 

**Building UA:** 9,255 CONDITIONED SQFT:

40,061

SYTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1:	3 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32	•		
Weeks of S	ummer: 20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	7	6	7	6	0
REQ STOP:	0	17	17	17	15	17	0

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.71
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	3,769,000
BLR CAP OUTPUT (BTUH):	3,015,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,020	3,360
HTG HRS ON:	1,632	5,376
H/C HRS ON:	2,659	8,760
CLG HRS SAVED:	2,340	<u>-</u>
HTG HRS SAVED:	3,744	•
C/H HRS SAVED:	6,101	7

CONSTANTS	
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY:

BLDG: 0817

BUILDING NAME: MNT HANGAR AVUM

## ENERGY CALCULATION SUMMARY

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u> –
Schedule ST/SP	0.00	6,294.14	0.00	
Opt ST/SP	0.00	512.74	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,806.88	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	21.37	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.0
and Safety Alarms TOTAL	0.00	6,806.88	21.37	. 4.

UMCS	TYPICAL SYSTEM	POINT	IND COS	T SUMM/	ARY	
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	Ō	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0817	BUILDING NAME:	MNT HANGAR AVUM	
	Building UA:	9,255	CONDITIONED SQFT:	40,061

# SYTEM INFORMATION System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
,	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	7	6		6	0
REQ STOP:	0	17	17	17	15	17	0

#### **INPUTS** 0.00 Motor HP: 0.64 HP Effic: 0.80 Load Factor: 0 CFM-HTG: 0 CFM-CLG: 0% %OA: 0% %Area: 4 CHILLER CAP (TONS): 1.10 KW-TON: BLR CAP INPUT (BTUH): 0 0 BLR CAP OUTPUT (BTUH):

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,020	3,360
HTG HRS ON:	1,632	5,376
H/C HRS ON:	2,659	8,760
CLG HRS SAVED:	2,340	•
HTG HRS SAVED:	3,744	•
C/H HRS SAVED:	6,101	-

<u>ONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY:

LOCATION: FT. RILEY, KS

BUILDING NAME: MNT HANGAR AVUM

ENERGY CALCULATION SUMMARY

System Type:

BLDG: 0817

Air cooled DX compressor System Name:

CH-1 System Number:

FUNCTION	- <u>kW/yr</u>	<u>kWhfyr</u>	<u>MBtu/yr</u> j <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	70.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	3.37	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			0.00

UMCS FUNCTN NO.	TYPICAL SYSTEN  UMCS APPLICATION	POINT A  DO  POINTS	AO POINTS	T SUMMA DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0817	BUILDING NAME:	MNT HANGAR AVUM	
	Building UA:	9,255	CONDITIONED SQFT:	40,061

# SYTEM INFORMATION ........

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32		
Weeks of S		20		

# SYSTEM OPERATING SCHEDULE

(2) (1) (1) (1) (1) (1) (1) (1) (1) (1) (1	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	7	6	7	6	0
REQ STOP:	0	17	17	17	15	17	0

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,020	3,360
HTG HRS ON:	1,632	5,376
H/C HRS ON:	2,659	8,760
CLG HRS SAVED	2,340	<u> </u>
HTG HRS SAVED	3,744	-
C/H HRS SAVED	6,101	<del></del>

v. v	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.00025
COAUC:	0.0006
HOAOHC:	33.
нолон:	53.
COAOHC:	0.0011
COAOC:	0.0030
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.0002
ECHC:	0.000079
NSUCHC:	0.00094
NSUCC:	0.0024
DDCCHC:	0.00023
DDCCC:	0.00061
NSC:	3660
DDCH:	3010
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 0817

BUILDING NAME: MNT HANGAR AVUM

# ENERGY CALCULATION SUMMARY

System Type:

System Name:

Air cooled DX compressor

System Number:

CH-2

FUNCTION -	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u>	<u>MH/yr</u> _
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00

UMCS	TYPICAL SYSTEM	POINT /	ND COS	r Summa	\RY	
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

# **ENERGY CALCULATION PARAMETERS**

[	Duilding HA.	0.055	CONDITIONED COST	
BLDG:	0817	BUILDING NAME:	MNT HANGAR AVUM	

Building UA: 9,255 CONDITIONED SQFT: 40,061

# SYTEM INFORMATION

System Type: 8
System Name: Air cooled DX compressor
System Number: CH-3

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 7 BRICK AND CMU BATTALION 0700-1800 M-F; SAT Weeks of Winter: 32

Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0.
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	7	6	7	6	0
REQ STOP:	0	17	17	17	15	17	0

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	8
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

## HOURS CALCULATIONS

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,020	3,360
HTG HRS ON:	1,632	5,376
H/C HRS ON:	2,659	8,760
CLG HRS SAVED:	2,340	)
HTG HRS SAVED:	3,744	
C/H HRS SAVED:	6,101	-

CONSTANTS	
HOAUHC:	16.2
HOAUH:	. 26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 0817

**BUILDING NAME: MNT HANGAR AVUM** 

# **ENERGY CALCULATION SUMMARY**

System Type:

System Name: Air cooled DX compressor

CH-3 System Number:

FUNCTION	<u>kW/yr</u>	<u>kWhiyr</u> -	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	140.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	6.73	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.4
TOTAL	6.73	140.00	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	AO POINTS	T SUMM/ DI POINTS	ARY  AI  POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	Ö	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0817	BUILDING N	IAME: MNI HANGAR AVUM	
	Building UA:	9.255	CONDITIONED SQFT:	40,061

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: H&V-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
• • •	3 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	f Winter: 32			
Weeks of S	Summer: 20			

# SYSTEM OPERATING SCHEDULE

Processing (1970) (1, 2 or a research excession (1, 2 or a res.)	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	. 0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	7	6	7	6	0
REQ STOP:	0	17	17	17	15	17	0

<u>INPUTS</u>	
Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	14,678
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,020	3,360
HTG HRS ON:	1,632	5,376
H/C HRS ON:	2,659	8,760
CLG HRS SAVED:	2,340	)
HTG HRS SAVED	3,744	-
C/H HRS SAVED:	6,101	Ī

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 **DATE**: 16-Sep-95

PREPARED BY:

LOCATION: FT. RILEY, KS

**BUILDING NAME: MNT HANGAR AVUM** 

**ENERGY CALCULATION SUMMARY** 

16 System Type:

BLDG: 0817

System Name: Heating and Ventilating Unit

H&V-1 System Number:

FUNCTION -	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u>	MH/yr
Schedule ST/SP	0.00	26,042.18	0.00	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	43.64	
Sub Total	0.00	28,163.67	43.64	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	18.79	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO POINTS	J SUMMA  DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0817 BUILDING NAME: MNT HANGAR AVUM

Building UA: 9,255

CONDITIONED SQFT:

40,061

#### SYTEM INFORMATION ..

System Type: 16

System Name: Heating and Ventilating Unit

System Number: H&V-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 METAL PANEL AND CM	U VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter:	32		
Weeks of S	ıımmer:	20		

# SYSTEM OPERATING SCHEDULE

*	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	7	6	7	6	0
REQ STOP:	0	17	17	17	15	17	0

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	14,678
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,020 3,360 1,632 5,376 HTG HRS ON: 8,760 H/C HRS ON: 2,659 CLG HRS SAVED: 2,340 3,744 HTG HRS SAVED: C/H HRS SAVED: 6,101

	<u>CONSTANTS</u>
HOAUHC: 0	HOAUI
HOAUH: 0	HOA
COAUHC: 0	COAU
COAUC: 0	COA
HOAOHC: 0	HOAO
HOAOH: 0	HOA
COAOHC: 0	COAO
COAOC: 0	COA
DC DUTY: 0.17	DC DU
C DEMAND: 0.17	DC DEMA
ECC: 0	E
ECHC: 0	EC
NSUCHC: 0.000105	NSUC
NSUCC: 0.000278	NSU
DDCCHC: 0.000161	DDCC
DDCCC: 0.000426	DDC
NSC: 94300	N
DDCH: 40600	DD
OPT: 305	0
<b>CHWR</b> : 17.5	CHV
CNWR: 0	CN
OAR: 5.67	0
NSUCHC: 0.0001  NSUCC: 0.0002  DDCCHC: 0.0004  DDCCC: 0.0004  NSC: 943  DDCH: 406  OPT: 3  CHWR: 1	NSUC NSU DDCC DDC N DDC C C CH

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 **DATE:** 16-Sep-95

PREPARED BY:

LOCATION: FT. RILEY, KS

BUILDING NAME: MNT HANGAR AVUM BLDG: 0817

ENERGY CALCULATION SUMMARY

16 System Type:

Heating and Ventilating Unit System Name:

H&V-2 System Number:

<u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
0.00	26,042.18	0.00	
0.00	2,121.49	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	43.64	
0.00	28,163.67	43.64	
0.00	0.00	0.00	-
0.00	0.00	0.00	
0.00	0.00	18.79	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         26,042.18           0.00         2,121.49           0.00         0.00           0.00         0.00           0.00         0.00           0.00         28,163.67           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         26,042.18         0.00           0.00         2,121.49         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         43.64           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         18.79           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0817	BUILDING NAME:	MNT HANGAR AVUM	
	Building UA:	9,255	CONDITIONED SQFT:	40,061

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: H&V-3

#### TYPICAL BUILDING INFORMATION -

Catagory Number: Construction:	Use:	Occupancy HRS:	Occupancy Days:
13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	. 6	7	6	7	6	0
REQ STOP:	0	17	17	17	15	17	0

<u>INPUTS</u>	
Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	14,678
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,020	3,360
HTG HRS ON:	1,632	5,376
H/C HRS ON:	2,659	8,760
CLG HRS SAVED:	2,340	)
HTG HRS SAVED:	3,744	<u> </u>
C/H HRS SAVED:	6,101	-

	<u>CONSTANTS</u>
0	HOAUHC:
0	HOAUH:
. 0	COAUHC:
0	COAUC:
0	HOAOHC:
0	НОАОН:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0.000105	NSUCHC:
0.000278	NSUCC:
0.000161	DDCCHC:
0.000426	DDCCC:
94300	NSC:
40600	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 0817 BUILDING NAME: MNT HANGAR AVUM

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit

System Number: H&V-3

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u> .	MBtulyr MH/yr
Schedule ST/SP	0.00	26,042.18	0.00
Opt ST/SP	0.00	2,121.49	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	43.64
Sub Total	0.00	28,163.67	43.64
Economizer	0.00	0.00	0.00
/entilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	18.79
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3

NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
Op lim	heduled start/stop control - AHU; timum start/stop - AHU; Demand iting - AHU; Duty Cycling - AHU; pht setback - AHU	etratik bilikisisi 1	0	O	1	\$348.00
30 Dir	ect digital control - H&V Unit	0	1	0	3	\$813.00
	tside air damper ventilation and irculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

EMC NO: 1406-001

40,061

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0817	BUILDING NAME:	MNT HANGAR AVUM

**Building UA:** 9,255 **CONDITIONED SQFT:** 

SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: H&V-4

#### TYPICAL BUILDING INFORMATION

C	Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	7	6	7	6	0
REQ STOP:	0	17	17	17	15	17	0

<u>INPUTS</u>	
Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	14,678
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	Õ

#### HOURS CALCULATIONS

BLR CAP OUTPUT (BTUH):

		PRESENT HR/YR
CLG HRS ON:	1,020	3,360
HTG HRS ON:	1,632	5,376
H/C HRS ON:	2,659	8,760
CLG HRS SAVED:	2,340	-    -
HTG HRS SAVED:	3,744	•
C/H HRS SAVED:	6,101	-

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

PREPARED BY:

BLDG: 0817 BUILDING NAME: MNT HANGAR AVUM

#### ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: H&V-4

FUNCTION - 1	kW/yr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	26,042.18	0.00
Opt ST/SP	0.00	2,121.49	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	43.64
Sub Total	0.00	28,163.67	43.64
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	18.79
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	28,163.67	62.42 3.00

ÚMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0817	BUILDING N	IAME: MNT HANGAR AVUM	
Building UA:	9,255	CONDITIONED SQFT:	40,061
SYTEM INFORMATION.			
System Type: 16			

SY EN INFORMATION	
System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	H&V-5

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1:	3 METAL PANEL AND	CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: THUR: FRI: SAT: 0 0 0 0 0 0 PRES START: PRES STOP: 24 24 24 24 24 24 24 0 6 6 **REQ START:** 0 6 **REQ STOP:** 0 17 17 17 15 17 0

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,800
CFM-CLG:	0
%OA:	100%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,020	3,360
HTG HRS ON:	1,632	5,376
H/C HRS ON:	2,659	8,760
CLG HRS SAVED	2,340	1
HTG HRS SAVED	3,744	
C/H HRS SAVED:	6,101	•

<u>NSTANTS</u>	
HOAUHC:	
HOAUH:	
COAUHC:	1.00
COAUC:	
HOAOHC:	
НОАОН:	
COAOHC:	
COAOC:	
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	
ECHC:	
NSUCHC:	0.00010
NSUCC:	0.00027
DDCCHC:	0.00016
DDCCC:	0.00042
NSC:	9430
DDCH:	4060
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY:

BLDG: 0817 BUILDING NAME: MNT HANGAR AVUM

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: H&V-5

<u>FUNCTION</u>	kW/yr	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	5,729.28	0.00	
Opt ST/SP	0.00	466.73	0.00	-
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	69.82	
Sub Total	0.00	6,196.01	69.82	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	30.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
	0.00	6,196.01	99.88	3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

40,061

**DATE**: 16-Sep-95

PREPARED BY:

LOCATION: FT. RILEY, KS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0817	BUILDING NAME:	MNT HANGAR AVUM
,	Building UA:	9,255	CONDITIONED SQFT:

SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: H&V-6

		RMATION.

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32
Weeks of Summer: 20

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	7	6	7	6	0
REQ STOP:	0	17	17	17	15	17	0

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	2,800
CFM-CLG:	0
%OA:	100%
0/ 4	E0/

INPUTS

%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00

BLR CAP INPUT (BTUH): 0
BLR CAP OUTPUT (BTUH): 0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,020	3,360
HTG HRS ON:	1,632	5,376
H/C HRS ON:	2,659	8,760
CLG HRS SAVED:	2,340	- )
HTG HRS SAVED:	3,744	-
C/H HRS SAVED:	6,101	_ 

# CONSTANTS

YY III	Transit for sensitive service
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY:

BLDG: 0817 BUILDING NAME: MNT HANGAR AVUM

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: H&V-6

<b>FUNCTION</b>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	4,529.23	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	43.64	
Sub Total	0.00	4,898.20	43.64	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	18.79	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	4,898.20	62.42	3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY:

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0817	BUILDING NAME:	MNT HANGAR AVUM	
	Building UA:	9,255	CONDITIONED SQFT:	40,061

#### SYTEM INFORMATION

System Type: 26
System Name: Pump
System Number: HWP-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND C	MU VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter:	32		
Weeks of St	ımmer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	. 0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	7	6	7	6	0
REQ STOP:	0	17	17	17	15	17	0

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,020	3,360
HTG HRS ON:	1,632	5,376
H/C HRS ON:	2,659	8,760
CLG HRS SAVED:	2,340	)
HTG HRS SAVED:	3,744	_  -
C/H HRS SAVED:	6,101	_ 

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BUILDING NAME: MNT HANGAR AVUM BLDG: 0817

ENERGY CALCULATION SUMMARY

System Type: 26 Pump System Name: System Number: HWP-1

FUNCTION :	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	5,729.28	0.00
Opt ST/SP	0.00	466.73	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	6,196.01	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	6,196.01	0.00 3.00

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	ARY	
UMCS FUNCTI NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

# **ENERGY CALCULATION PARAMETERS**

		· · · · · · · · · · · · · · · · · · ·
PLDG: 0817	BUILDING NAME:	MNT HANGAR AVUM

BLDG:	0817	BUILDING NAME:	MNT HANGAR AVUM
BLDG:	U81 <i>7</i>	BUILDING NAME.	MINI HANGAR AVOIN

Building UA: 9,255 CONDITIONED

CONDITIONED SQFT: 40,061

#### SYTEM INFORMATION

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

# TYPICAL BUILDING INFORMATION: Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

7-11-12-12-12-12-12-12-12-12-12-12-12-12-	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	7	6	7	6	0
REQ STOP:	0	17	17	17	15	17	0

Motor HP:	10.00
HP Effic:	0.43
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	C
%OA:	0%
%Area:	60%
CHILLER CAP (TONS):	
KW-TON:	0.00
BLR CAP INPUT (BTUH):	(
BLR CAP OUTPUT (BTUH):	(

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,020	3,360
HTG HRS ON:	1,632	5,376
H/C HRS ON:	2,659	8,760
CLG HRS SAVED	2,340	- )
HTG HRS SAVED	3,744	,
C/H HRS SAVED	6,101	_

Committee of the contract of t	20 31 25 CARROLL SECTION STATE AND A SECTION S
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	(
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

PREPARED BY:

BLDG: 0817 BUILDING NAME: MNT HANGAR AVUM

ENERGY CALCULATION SUMMARY

System Type: 25
System Name: Hot water radiation pump
System Number: RAD-1

0.00 0.00 0.00	52,083.76 4,242.93	0.00
		0.00
0.00		
	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	56,326.69	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		3.0
		0.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         0.00           0.00         56,326.69           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

	TYPICAL SYSTEM	I POINT A	ND COS	T SUMM/	<b>ARY</b>	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
	TOTAL:	1	0	1	1	\$570.00

# BUILDING 820 TACTICAL EQUIPMENT SHOP

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0820	BUILDING NAME:	TAC EQUIP SHOP	
	Building UA:	8,561	CONDITIONED SQFT:	20,564

# SYTEM INFORMATION

System Name: Air cooled DX compressor

System Number: ACCU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	12
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# REQUIRED HR/YR PRESENT HR/YR CLG HRS ON: 840 3,360 HTG HRS ON: 1,344 5,376 H/C HRS ON: 2,190 8,760 CLG HRS SAVED: 2,520

4,032

6,570

HOURS CALCULATIONS

HTG HRS SAVED:

C/H HRS SAVED:

CONSTANTS	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

CNTRCT #: DACA 01-94-D-003; LOCATION: FT. RILEY, KS **EMC NO**: 1406-001 **DATE**: 16-Sep-95

PREPARED BY: JM

BLDG: 0820 BUILDING NAME: TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-1

<u>kW/yr</u>	<u>kWh/yr</u> :	MBtu/yr MH/yr
0.00	.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	210.00	0.00
0.00	0.00	0.00
10.10	0.00	0.00
		3.
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         .00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMMA DI POINTS	ARY  AI  POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0		0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #:** DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

#### PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0820	BUILDING NAME	:: TAC EQUIP SHOP	
	Building UA:	8,561	CONDITIONED SQFT:	20,564

# SYTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

TYPICAL BUILD	ING INFORMATIO	<u> </u>			
Catagory Number:	Construction:	Use:	Marie Andrews Andrews Commission Commission	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATT	ALION	0700-1800	M-F; SAT
Weeks of	Winter:	32	•		
Weeks of S	Summer:	20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

Motor HP:	10.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	4,800
CFM-CLG:	4,800
%OA:	12%
%Area:	45%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	HR/YR	HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	-
HTG HRS SAVED:	4,032	- !
C/H HRS SAVED:	6,570	

CONSTANTS	
HOAUHC:	16.2
HOAUH:	. 26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM

BLDG: 0820 B

BUILDING NAME: TAC EQUIP SHOP ENERGY CALCULATION SUMMARY

Magazina Silan in Commun

System Type: 15
System Name: Small Single Zone air handling unit

System Number: AHU-1

: <u>kW/yr</u> -	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
0.00	49,023.75	61.31	
0.00	2,230.69	0.00	
0.00	0.00	0.00	
14.92	0.00	0.00	
0.00	29,675.38	141.00	
14.92	80,929.81	202.31	
0.00	835.70	0.00	
0.00	45.15	2.85	
0.00	2,449.30	115.96	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.0
	0.00 0.00 0.00 14.92 0.00 14.92 0.00 0.00 0.00 0.00 0.00 0.00	0.00         49,023.75           0.00         2,230.69           0.00         0.00           14.92         0.00           0.00         29,675.38           14.92         80,929.81           0.00         835.70           0.00         45.15           0.00         2,449.30           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         49,023.75         61.31           0.00         2,230.69         0.00           0.00         0.00         0.00           14.92         0.00         0.00           0.00         29,675.38         141.00           14.92         80,929.81         202.31           0.00         835.70         0.00           0.00         45.15         2.85           0.00         2,449.30         115.96           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS UNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO	T SUMMA DI POINTS	ARY AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0820	BUILDING NAME	: TAC EQUIP SHOP	
	Building UA:	8,561	CONDITIONED SQFT:	20,564
		-		

# SYTEM INFORMATION System Type: 1 System Name: Small hot water boiler System Number: BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CM	U VEH MAINT SHOP	0700-1800	M-F
Weeks o	f Winter: 3	2		
Weeks of	Summer: 2	0		

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9		9	0
REQ STOP:	0	17	17	17	15	17	0

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	(
CFM-CLG:	
%OA:	0%
%Area:	15%
CHILLER CAP (TONS):	
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,898,000
BLR CAP OUTPUT (BTUH):	2,318,000

		PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	- ),
HTG HRS SAVED:	4,032	1
C/H HRS SAVED:	6,570	,

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	. 0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS PREPA

PREPARED BY: JM

EMC NO: 1406-001

**DATE**: 16-Sep-95

BLDG: 0820 BUILDING NAME: TAC EQUIP SHOP

**ENERGY CALCULATION SUMMARY** 

System Type: 1
System Name: Small hot water boiler

System Number: BLR-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	28,045.43	0.00
Opt ST/SP	0.00	2,121.49	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00'
Night Setback	0.00	0.00	0.00
Sub Total	0.00	30,166.92	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	16.43
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.00
TOTAL	0.00	30,166.92	16.43 4.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	O	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

20,564

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

Building UA: 8,561 CONDITIONED SQFT:

SYTEM INFORMATION \*\*:

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	3 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32	•		
Weeks of S	ummer: 20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

INPUTS	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	3,400
CFM-CLG:	0
%OA:	100%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	-
HTG HRS SAVED:	4,032	1
C/H HRS SAVED:	6,570	•

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM

BLDG: 0820

BUILDING NAME: TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type:

Heating and Ventilating Unit System Name:

HV-1 System Number:

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	161.46	
Sub Total	0.00	9,829.07	161.46	
Economizer	0.00	0.00	0.00	
/entilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	69.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #:** DACA 01-94-D-0033

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG: 0820	BUILDING	NAME: TAC EQUIP SHOP	
Building UA:	8,561	CONDITIONED SQFT:	20,564
SYTEM INFORMATION			

<u>SYTEM INFORMATION</u>		S. C. C. C. Co.
System Type:	16	
System Name:	Heating and Ventilating Unit	
System Number:	MAU-1	

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1:	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of S	ummer: 20			

SYSTEM OPERA	TING S	CHEDUL	E					
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:	2
PRES START:	0	0	0	0	0	0	0	
PRES STOP:	24	24	24	24	24	24	24	
REQ START:	0	9	7	9	7	9	0	
REQ STOP:		17	17	17	15	17	0	

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	3,100
CFM-CLG:	0
%OA:	100%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	840	3,360
HTG HRS ON:	1,344	5,376
H/C HRS ON:	2,190	8,760
CLG HRS SAVED:	2,520	)
HTG HRS SAVED:	4,032	- !
C/H HRS SAVED:	6,570	)

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	. 0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

BLDG: 0820

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

PREPARED BY: JM

LOCATION: FT. RILEY, KS

BUILDING NAME: TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit

System Number: MAU-1

FUNCTION :	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	161.46	
Sub Total	0.00	9,829.07	161.46	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	69.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	0.00	9,829.07	230.98	3.0

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0820	 BUILDING NAME:	TAC EQUIP SHOP

Building UA: 8,561

CONDITIONED SQFT:

20,564

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-2

TYPICAL BUILD	ING INFORMATION			
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of S	ummer: 20	ō <sup>-</sup>		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	7	9	7	9	0
REQ STOP:	0	17	17	17	15	17	0

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	3,100
CFM-CLG:	0
%OA:	100%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# REQUIRED HR/YR PRESENT HR/YR CLG HRS ON: 840 3,360 HTG HRS ON: 1,344 5,376 H/C HRS ON: 2,190 8,760

HIGHRS ON:	1,344
H/C HRS ON:	2,190
CLG HRS SAVED:	2,520
HTG HRS SAVED:	4,032
C/H HRS SAVED:	6,570

**HOURS CALCULATIONS** 

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM

BLDG: 0820

BUILDING NAME: TAC EQUIP SHOP

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-2

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtulyr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	9,137.84	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	161.46	
Sub Total	0.00	9,829.07	161.46	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	69.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	0.00	9,829.07	230.98	3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

# BUILDING 833 AIRCRAFT HANGAR

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AMS/AJN

LOCATION: FT. RILEY, KS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0833	BUILDING NAME:	AIRCRAFT HANGAR

Building UA: 10,102 CONDITIONED SQFT: 52,080

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

# TYPICAL BUILDING INFORMATION

 Catagory Number:
 Construction:
 Use:
 Occupancy HRS:
 Occupancy Days:

 7 BRICK AND CMU
 BATTALION
 0700-1800
 M-F; SAT

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	. 0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

	La Company of Land Company
Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	1,800
%OA:	15%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0

# **HOURS CALCULATIONS**

BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

CONSTANTS		
	HOAUHC:	16.2
	HOAUH:	26.1
	COAUHC:	0.000257
	COAUC:	0.00068
	HOAOHC:	33.3
	НОАОН:	53.5
	COAOHC:	0.00115
	COAOC:	0.00305
	DC DUTY:	0.17
DC	DEMAND:	0.17
	ECC:	0.00021
	ECHC:	0.0000795
···· ··· · · · · · · · · · · · ·	NSUCHC:	0.000941
	NSUCC:	0.00249
	DDCCHC:	0.000233
	DDCCC:	0.000616
	NSC:	36600
	DDCH:	30100
	OPT:	305
	CHWR:	17.5
	CNWR:	0
	OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AMS/AJN

BLDG: 0833 BUILDING NAME: AIRCRAFT HANGAR

ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit

System Number: AHU-1

FUNCTION -	kW/vr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	1,947.63	0.00
Opt ST/SP	0.00	206.85	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.52	0.00	0.00
Night Setback	0.00	10,129.32	0.00
Sub Total	0.52	12,283.79	0.00
Economizer	0.00	415.80	0.00
Ventilation/Recirculation	0.00	56.00	0.00
DDC Control	0.00	1,219.68	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0

TYPICAL SYSTEM POINT AND COST SUMMARY							
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST	
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	O	1	\$348.00	
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00	
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00	
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0833	BUILDING NAME:	AIRCRAFT HANGAR	
	Building UA:	10,102	CONDITIONED SQFT:	52,080

# SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

TYPICAL BUILD	ING INFORMATIO	<u>)N</u>			
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
,	7 BRICK AND CMU		BATTALION	0700-1800	M-F; SAT
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	. 0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

<u>inputs</u>	
Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	1,550
%OA:	15%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	- )
HTG HRS SAVED:	3,616	5
C/H HRS SAVED:	5,892	

CONSTANTS	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
нолон:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AMS/AJN

BLDG: 0833 BUILDING NAME: AIRCRAFT HANGAR

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

0.00	1,890.00	0.00	
	.,	0.00	
0.00	206.85	0.00	
0.00	0.00	0.00	
0.52	0.00	0.00	
0.00	8,722.47	0.00	
0.52	10,819.31	0.00	
0.00	358.05	0.00	
0.00	48.22	0.00	
0.00	1,050.28	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.0
	0.52 0.00 0.52 0.00 0.00 0.00 0.00 0.00 0.00	0.52     0.00       0.00     8,722.47       0.52     10,819.31       0.00     358.05       0.00     48.22       0.00     1,050.28       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00	0.52     0.00     0.00       0.00     8,722.47     0.00       0.52     10,819.31     0.00       0.00     358.05     0.00       0.00     48.22     0.00       0.00     1,050.28     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	IRY	
UMCS UNCTN NO.	UMCS APPLICATION	DO - POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0833	BUILDING NAME:	AIRCRAFT HANGAR

Building UA: 10,102 CONDITIONED SQFT: 52,080

#### SYTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

<u>NPUTS</u>	
Motor HP:	5.00
HP Effic:	0.73
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	4,000,000
BLR CAP OUTPUT (BTUH):	3,320,000

# REQUIRED HR/YR PRESENT HR/YR CLG HRS ON: 1,100 3,360 HTG HRS ON: 1,760 5,376 H/C HRS ON: 2,868 8,760 CLG HRS SAVED: 2,260

3,616

5,892

HOURS CALCULATIONS

HTG HRS SAVED: C/H HRS SAVED:

20,000	
NT	
3,360 5,376	
8,760	

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AMS/AJN

BLDG: 0833	BUILDING NAME:	AIRCRAFT	HANGAR
	ENERGY CALCULAT	TON SUN	IMARY
System Type:	1		!
System Name:	Small hot water boiler		
System Number:	BLR-1		i

<u>kWiya</u>	kWh/yr	MBtu/yr MH/yr
0.00	14,821.63	0.00
0.00	1,250.16	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	16,071.79	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	22.68
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		4.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         14,821.63           0.00         1,250.16           0.00         0.00           0.00         0.00           0.00         0.00           0.00         16,071.79           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	POINT A  DO  POINTS	AO POINTS	T SUMMA  DI POINTS	ARY AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	<b>, , ,</b> , , , , ,	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95

PREPARED BY: JM/AMS/AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	0833	BUILDING NAME:	AIRCRAFT HANGAR	
	Building UA:	10,102	CONDITIONED SQFT:	52,080

#### SYTEM INFORMATION - ....

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

Catagory Number:	Construction:	t	Jse:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	E	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	. 0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	(
CFM-CLG:	
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	(
KW-TON:	1.10
BLR CAP INPUT (BTUH):	(
BLR CAP OUTPUT (BTUH):	(

### HOURS CALCULATIONS

REQUIRED	PRESENT
HR/YR	HR/YR
1,100	3,360
1,760	5,376
2,868	8,760
2,260	•
3,616	-
5,892	-
	HR/YR : 1,100 : 1,760 : 2,868 : 2,260 : 3,616

	CONSTANTS
16.2	HOAUHC:
26.1	HOAUH:
0.000257	COAUHC:
0.00068	COAUC:
33.3	НОАОНС:
53.5	НОАОН:
0.00115	COAOHC:
0.00305	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.00021	ECC:
0.0000795	ECHC:
0.000941	NSUCHC:
0.00249	NSUCC:
0.000233	DDCCHC:
0.000616	DDCCC:
36600	NSC:
30100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

BLDG:	0833	BUILDING NAME:	AIRCRAFT HANGAR
	ENER	GY CALCULAT	ION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

CH-1 System Number:

<u>FUNCTION</u>	<u>kW/yr</u> j	<u>kWh/yr</u>	MBtu/yr MH/	Yr.
Schedule ST/SP	0.00	.00	0.00	7. Name 1 10 10 10 10 10 10 10 10 10 10 10 10 1
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	105.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	5.05	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00

UMCS FUNCTN NO.		POINT A DO POINTS	AND COS  AO  POINTS	T SUMMA DI POINTS	AT POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	O	\$243.00
	TOTAL:		0		0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

#### PREPARED BY: JM/AMS/AJN

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0833	BUILDING NAME:	AIRCRAFT HANGAR	
	Building UA:	10,102	CONDITIONED SQFT:	52,080

### SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32		

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### **HOURS CALCULATIONS** REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,100 3,360 HTG HRS ON: 1,760 5,376 H/C HRS ON: 2,868 8,760 CLG HRS SAVED: 2,260 3,616 HTG HRS SAVED: C/H HRS SAVED: 5,892

CONSTANTS	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	C
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001

**DATE**: 16-Sep-95

PRE

PREPARED BY: JM/AMS/AJN

BLDG: 0833

**BUILDING NAME: AIRCRAFT HANGAR** 

**ENERGY CALCULATION SUMMARY** 

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-2

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/y	
0.00	.00	0.00	20, 2, 20 110, 3 11451112
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	-
0.00	0.00	0.00	
0.00	70.00	0.00	
0.00	0.00	0.00	
3.37	0.00	0.00	
			3.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         .00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         .00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO - POINTS	AO POINTS	T SUMMA Di Points	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	Ō	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AMS/AJN

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0833	BUILDING NAME:	AIRCRAFT HANGAR	
	Building UA:	10,102	CONDITIONED SQFT:	52,080

### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: H&V-1

## TYPICAL BUILDING INFORMATION

Catagory Number: Construction:	Use:	Occupancy HRS:	Occupancy Days:
13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32
Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

0

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	10,475
CFM-CLG:	0
%OA:	100%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C

### HOURS CALCULATIONS

BLR CAP OUTPUT (BTUH):

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED	2,260	<del></del> )
HTG HRS SAVED	3,616	5
C/H HRS SAVED	5,892	- } -
		-

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AMS/AJN

BLDG: 0833 BUILDING NAME: AIRCRAFT HANGAR

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: H&V-1

FUNCTION -	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	13,223.22	0.00
Opt ST/SP	0.00	1,115.34	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	142.89
Sub Total	0.00	14,338.56	142.89
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	61.52
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			204.41

TYPICAL SYSTEM POINT AND COST SUMMARY						
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0833	BUILDING NAME:	AIRCRAFT HANGAR
		10.100	CONDITIONED COFT.

52,080 CONDITIONED SQFT: **Building UA:** 10,102

### SYTEM INFORMATION

System Type: 16 System Name: Heating and Ventilating Unit System Number: H&V-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of Su	ımmer: 20			

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	7,485
CFM-CLG:	0
%OA:	100%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### **HOURS CALCULATIONS** REQUIRED PRESENT HR/YR HR/YR 3,360 CLG HRS ON: 1,100 HTG HRS ON: 1,760 5,376 8,760 2,868 H/C HRS ON: 2,260 CLG HRS SAVED: HTG HRS SAVED: 3,616 5,892 C/H HRS SAVED:

<u>NSTANTS</u>	
HOAUHC:	C
HOAUH:	O
COAUHC:	0
COAUC:	O
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AMS/AJN

BLDG: 0833 BUILDING NAME: AIRCRAFT HANGAR

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: H&V-2

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	8,195.05	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	142.89	
Sub Total	0.00	8,886.28	142.89	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	61.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.(

TYPICAL SYSTEM POINT AND COST SUMMARY						
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0833	BUILDING NAME:	AIRCRAFT HANGAR	
	Building UA:	10,102	CONDITIONED SQFT:	52,080

# SYTEM INFORMATION

(100 mg/s)		
	System Type: 26	
	System Name: Pump	
i	System Number: HWP-1	

TYPICAL BUILD	DING INFORMAT	TION .			
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL A	ND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks o	of Winter:	32			
Weeks of	Summer:	20			

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: THUR: SAT: PRES START: 0 0 0 0 0 0 0 24 PRES STOP: 24 24 24 24 24 24 6 0 6 6 0 **REQ START:** 6 6 17 REQ STOP: 0 17 17 17 17 0

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED	2,260	
HTG HRS SAVED	3,616	I
C/H HRS SAVED	5,892	 !

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

BLDG: 0833

BUILDING NAME: AIRCRAFT HANGAR

					A											

DEDG. 0000		·
	ENERGY C	<b>ALCULATION SUMM</b>
System Type:	26	a Calaba, Baragasan Wasan ya Afrika Marina Marina Afrika Marina ya 1 - Ari 1975 Afrika Wasan Marina Afrika Mar
System Name:	Pump	
System Number:	HWP-1	

0.00	13,223.22	0.00
0.00		
5.50	1,115.34	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	14,338.56	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		3.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         0.00           0.00         0.00           0.00         14,338.56           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS FUNCTN NO:		POINT A  DO POINTS	AO	SUMMA DI POINTS	AI POINTS	COST
24	Scheduled start/stop control -	1	0	1	0	\$386.00
	Pump; Optimum start/stop - Pump;					
	Demand limiting - Pump					
	TOTAL:		0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0833	BUILDING NAME	: AIRCRAFT HANGAR	
	Building UA:	10,102	CONDITIONED SQFT:	52,080

### SYTEM INFORMATION - \* ::

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

TYPICAL BUILD	ING INFORMATION	CONTRACTOR OF SECTION AND ADMINISTRAL PROPERTY OF A SECTION AND ADMINISTRAL PROPERTY OF A SECTION AND ADMINISTRAL PROPERTY OF A SECTION AND ADMINISTRAL PROPERTY OF A SECTION AND ADMINISTRAL PROPERTY OF A SECTION AND ADMINISTRAL PROPERTY OF A SECTION AND ADMINISTRAL PROPERTY OF A SECTION AND ADMINISTRAL PROPERTY OF A SECTION AND ADMINISTRAL PROPERTY OF A SECTION AND ADMINISTRAL PROPERTY OF A SECTION AND ADMINISTRAL PROPERTY OF A SECTION AND ADMINISTRAL PROPERTY OF A SECTION AND ADMINISTRAL PROPERTY OF A SECTION AND ADMINISTRAL PROPERTY OF A SECTION AND ADMINISTRAL PROPERTY OF A SECTION AND ADMINISTRAL PROPERTY OF A SECTION AND ADMINISTRAL PROPERTY OF A SECTION AND ADMINISTRAL PROPERTY OF A SECTION AND ADMINISTRATION AND ADMINI		
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 METAL PANEL AND C	MU VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

### SYSTEM OPERATING SCHEDULE

0000000	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	2.00
HP Effic:	0.39
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	70%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	C

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,370
H/C HRS ON:	2,868	8,76
CLG HRS SAVED	2,260	,
HTG HRS SAVED	3,616	5 <sup>-</sup>
C/H HRS SAVED	5,892	2

	<u>ONSTANTS</u>
0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	HOAOH:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0.000105	NSUCHC:
0.000278	NSUCC:
0.000161	DDCCHC:
0.000426	DDCCC:
94300	NSC:
40600	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AMS/AJN

**BUILDING NAME: AIRCRAFT HANGAR** BLDG: 0833

ENERGY CALCULATION SUMMARY

25 System Type:

Hot water radiation pump System Name:

System Number: RAD-1

<u>FUNCTION</u>	<u>kWlyc</u>	<u>kWh/yr</u>	MBtu/yr   MH/yr
Schedule ST/SP	0.00	11,066.67	0.00
Opt ST/SP	0.00	933.44	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	12,000.12	0.00
Economizer	0.00	0.00	0.00
/entilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0

UMCS	TYPICAL SYSTEM	I POINT A		TSUMMA	RY 🗀	
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
	TOTAL	1	0	•	1	\$570.00

### BUILDING 835 MAF OPS BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY:

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0835	BUILDING NA	ME:	MAF OPS BLDG	
	Building UA:	4,060		CONDITIONED SQFT:	19,470

### SYTEM INFORMATION

NFORMATION	
System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-1

THIOUE DOILD	ING INFORMATIO	N	OUDS	0
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of	f Winter:	32		
Weeks of S	Summer:	20	•	

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	. 0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	18,500
CFM-CLG:	18,500
%OA:	10%
%Area:	67%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

REQUIRED	PRESENT
HR/YR	HR/YR
1,100	3,360
1,760	5,376
2,868	8,760
2,260	- !
3,616	-
5,892	<del>.</del>    -
	HR/YR : 1,100 : 1,760 : 2,868 : 2,260 : 3,616

CONSTANTS	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

#: DACA 01-94-D-0033

PREPARED BY:

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

BUILDING NAME: MAF OPS BLDG

**ENERGY CALCULATION SUMMARY** 

System Type: 11

BLDG: 0835

System Name: Variable Air Volume air handling unit

System Number: AHU-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	34,538.16	176.59	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	102,573.37	99.56	
Sub Total	10.99	138,754.34	276.15	
Economizer	0.00	4,217.90	0.00	
Ventilation/Recirculation	0.00	145.01	9.14	
DDC Control	0.00	12,361.90	81.88	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
32	Direct digital control - VAV AHU	0	3	0	11	\$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

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**EMC NO:** 1406-001

**CLIENT CNTRCT #**: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0835	BUILDING NAME:	MAF OPS BLDG	
	Building UA:	4,060	CONDITIONED SQFT:	19,470

### SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

TYPICAL BUILD	ING INFORMATIC	<u>N</u>			
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	25
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED	2,260	-
HTG HRS SAVED	3,616	=
C/H HRS SAVED:	5,892	-

CONSTANTS	i je vilo je je
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY:

BLDG: 0835 BUILDING NAME: MAF OPS BLDG

ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

<u>FUNCTION</u>	<u>kWlyr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	437.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	21.04	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	The second secon		3.00
TOTAL	21.04	437.50	0.00

UMCS FUNCEN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	AO	T SUMMA  DI  POINTS	ARY AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	O	\$243.00
	TOTAE:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

### **ENERGY CALCULATION PARAMETERS**

BLDG: 0835	BUILDING N	AME: MAF OPS BLDG	
Building UA:	4,060	CONDITIONED SQFT:	19,470
SYTEM INFORMATION			
System Type: 25			
System Name: Hot wate	r radiation pump		

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

### SYSTEM OPERATING SCHEDULE

System Number: RAD-1

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	. 0
PRES STOP:	24	24.	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	3.00
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	0
%OA:	0%
%Area:	33%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	•
C/H HRS SAVED:	5,892	-

<u>CONSTANTS</u>	*
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
ноаон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY:

BLDG: 0835 BUILDING NAME: MAF OPS BLDG
ENERGY CALCULATION SUMMARY

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

FUNCTION :	<u>kW/yr</u> -	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	8,748.77	0.00
Opt ST/SP	0.00	737.94	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	9,486.70	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0

UMCS FUNCTI NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	ND COS AO POINTS	T SUMMA  DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW	1	0	1	1	\$570.00
	Pump; Night setback - HW Pump		0	1		\$570.00

### BUILDING 840 VEHICLE MAINTENANCE SHOP ORG

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95 PREPARED BY:

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0840	DITTI DINO MANE.	VEHICLE MAIT CHOP COO
DLDG.	V0+0	BUILDING NAME:	VEHICLE MNT SHOP ORG

**Building UA:** 3,810

CONDITIONED SQFT:

9,152

### SYTEM INFORMATION .....

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 7 BRICK AND CMU **BATTALION** 0700-1800 M-F; SAT Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	1,460
CFM-CLG:	1,460
%OA:	15%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	•
C/H HRS SAVED:	6,414	

<u>CONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 0840

BUILDING NAME: VEHICLE MNT SHOP ORG

### ENERGY CALCULATION SUMMARY

System Type:

Small Single Zone air handling unit System Name:

AHU-1 System Number:

= FUNCTION :	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	8,119.66	22.75
Opt ST/SP	0.00	368.97	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	2.47	0.00	0.00
Night Setback	0.00	8,811.35	27.89
Sub Total	2.47	17,299.98	50.64
Economizer	0.00	272.35	0.00
Ventilation/Recirculation	0.00	17.17	1.08
DDC Control	0.00	798.21	22.94
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			74.66

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

### **ENERGY CALCULATION PARAMETERS**

DI DC.	0040	DITE DING NAME.	VEHICLE MNT SHOP ORG
BLDG:	U04U	DUILDING NAME:	VEHICLE WIN I SHOP ONG

Building UA: 3,810

CONDITIONED SQFT:

9,152

### SYMEMUNEORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	3 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of S				

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0:	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	C
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	
KW-TON:	0.00
BLR CAP INPUT (BTUH):	600,000
BLR CAP OUTPUT (BTUH):	480,000

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 3,360 900 HTG HRS ON: 1,440 5,376 H/C HRS ON: 2,346 8,760 2,460 CLG HRS SAVED: HTG HRS SAVED: 3,936 6,414 C/H HRS SAVED:

<u>ONSTANTS</u>	
HOAUHC:	(
HOAUH:	(
COAUHC:	(
COAUC:	(
HOAOHC:	(
НОАОН:	(
COAOHC:	
COAOC:	(
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	(
ECHC:	(
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.00016
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	30:
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BUILDING NAME: VEHICLE MNT SHOP ORG BLDG: 0840

ENERGY CALCULATION SUMMARY

System Type: Small hot water boiler System Name: BLR-1 System Number:

FUNCTION -	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	4,761.50	0.00
Opt ST/SP	0.00	368.97	0.00
Duty Cycle	0.00	0.00	0.00'
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	5,130.46	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	3.40
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.0 3.40

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY:

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0840	BUILDING NAME:	VEHICLE MNT SHOP ORG	
	Building UA:	3,810	CONDITIONED SQFT:	9,152

# SYTEM INFORMATION System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32		
Weeks of S		32		

### SYSTEM OPERATING SCHEDULE

and the second section of the section of the	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	C
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	6
KW-TON:	1.10
BLR CAP INPUT (BTUH):	(
BLR CAP OUTPUT (BTUH):	(

### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON	1,440	5,376
H/C HRS ON	2,346	8,760
CLG HRS SAVED	2,460	<u> </u>
HTG HRS SAVED	3,936	5
C/H HRS SAVED	6,414	<b>,</b>

HOALILIC	16.2
HOAUHC:	
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG:	0840	BUILDING NAME:	VEHICLE MNT SHOP ORG

### ENERGY CALCULATION SUMMARY

System Type:

System Name: Air cooled DX compressor

System Number: CH-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	***************************************
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	105.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	5.05	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			,	3.00

UMCS FUNCIN NO	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	ND COS AO POINTS	C SUMMA DI POINTS	ARY  AI  POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0.5	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0840	BUILDING NAME:	VEHICLE MNT SHOP ORG

DLDG:	0040	BUILDING NAME:	VEHICLE MNT SHOP ORG	

Building UA:	3 ጸ1በ	CONDITIONED SQFT:	0.450
	0,010	CONDITIONED SQF1:	9,152
		Transfer of the second of the	

### SYTEM INFORMATION ....

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CM	U VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter:	32		
Weeks of Su	ımmer:	20		

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	2,370
CFM-CLG:	2,370
%OA:	58%
%Area:	50%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	- )
HTG HRS SAVED:	3,936	i
C/H HRS SAVED:	6,414	<del>-</del> :

CONSTANTS CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY:

BLDG: 0840 BUILDING NAME: VEHICLE MNT SHOP ORG

### ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> N	<u>H/yr</u>
Schedule ST/SP	0.00	8,920.27	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	9,611.50	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	123.44	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	9,611.50	123.44	3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO	AO	DI	ARY AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0840		BUILDING N	AME: VEH	IICLE MNT SHOP ORG	
	Building UA:		3,810	C	ONDITIONED SQFT:	9,152
YTEN	INFORMATION				To the state of th	
		CARACA CALL	Control of the contro			and the street of the contract of
	System Type:	16			,	
	System Type: System Name:		/entilating Unit			

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1:	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of S				

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	. 7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	-
HTG HRS SAVED:	3,936	, ,
C/H HRS SAVED:	6,414	- ŀ.

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY:

BLDG: 0840 BUILDING NAME: VEHICLE MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	8,920.27	0.00	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	17.96	
Sub Total	0.00	9,611.50	17.96	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	7.73	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	9,611.50	25.70	3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

### **ENERGY CALCULATION PARAMETERS**

BLDG: 0840 BUILDING NAME: VEHICLE MNT SHOP ORG	BLDG:	0840	<b>BUILDING NAME:</b>	VEHICLE MNT SHOP ORG
--	-------	------	-----------------------	----------------------

Building UA: 3,810 CONDITIONED SQFT:

9,152

### SYTEM NEORMATION

System Type: 20

System Name: Infrared Radiant Heaters

System Number: RAD-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CM	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 3	2		
Weeks of Su	ımmer: 2	0		

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16:	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	25%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	-
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

ONSTANTS	
HOAUHC:	(
HOAUH:	(
COAUHC:	(
COAUC:	(
HOAOHC:	
нолон:	
COAOHC:	
COAOC:	
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	
ECHC:	
NSUCHC:	0.00010
NSUCC:	0.00027
DDCCHC:	0.00016
DDCCC:	0.00042
NSC:	9430
DDCH:	4060
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 0840 BUILDING NAME: VEHICLE MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 20
System Name: Infrared Radiant Heaters
System Number: RAD-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	1,192.57	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	89.82	
Sub Total	0.00	1,284.98	89.82	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			89.82	, 0.00

UMCS FUNCTN NO.	TYPICAL SYSTEN  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMMA  DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	O	1	2	\$1,213.00
	TOTAL:	4	0	1	2	\$1,213.00

### BUILDING 853 MAINTENANCE HANGAR AVUM

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0853	BUILDING NAME:	MNT HANGAR AVUM	
	Building UA:	9,332	CONDITIONED SQFT:	48,112

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

TYPICAL BUILD	ING INFORMATIO	N ·	Use:	Occupancy HRS:	Occupancy Days:
Catagory Number:	7 BRICK AND CMU		BATTALION	0700-1800	M-F; SAT
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	. 0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7		7	7	0
REQ STOP:	0	17	17	17	15	17	0

2.00	Motor HP:
0.78	HP Effic:
0.80	Load Factor:
3,00	CFM-HTG:
3,00	CFM-CLG:
20%	%OA:
5%	%Area:
	CHILLER CAP (TONS):
0.0	KW-TON:
	BLR CAP INPUT (BTUH):
	BLR CAP OUTPUT (BTUH):

### HOURS CALCULATIONS

	<u>SENT</u> <u>(R</u>
960	3,360
1,536	5,376
2,503	8,760
2,400	
3,840	
6,257	
	960 1,536 2,503 2,400 3,840

<u>ONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.
нолон:	53.
COAOHC:	0.0011
COAOC:	0.0030
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.0002
ECHC:	0.000079
NSUCHC:	0.00094
NSUCC:	0.0024
DDCCHC:	0.00023
DDCCC:	0.00061
NSC:	3660
DDCH:	3010
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

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**EMC NO:** 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 0853 BUILDING NAME: MNT HANGAR AVUM

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

FUNCTION DELE	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	10,539.88	60.82	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	17,663.91	17.08	
Sub Total	3.12	28,670.53	77.90	
Economizer	0.00	596.93	0.00	
Ventilation/Recirculation	0.00	47.03	2.96	
DDC Control	0.00	1,749.50	14.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	3.12	31,063,99	94.91	3.0

UMCS UNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMM/ DI POINTS	ARY AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

### **ENERGY CALCULATION PARAMETERS**

**BUILDING NAME: MNT HANGAR AVUM BLDG**: 0853

**Building UA:** 9,332 CONDITIONED SQFT:

48,112

SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

Catagory Number:	Construction:	-	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	J	BATTALION	0700-1800	M-F; SAT
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	٠. ٥	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	15	17	0

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	2,700
CFM-CLG:	2,700
%OA:	20%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	960	3,360
HTG HRS ON:	1,536	5,376
H/C HRS ON:	2,503	8,760
CLG HRS SAVED	2,400	)
HTG HRS SAVED	3,840	)
C/H HRS SAVED	6,257	•

<u>ONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0853 BUILDING NAME: MNT HANGAR AVUM

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

FUNCTION	- <u>kWiyr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	10,443.40	54.74	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	15,897.52	17.08	
Sub Total	3.12	26,807.65	71.82	
Economizer	0.00	537.24	0.00	
Ventilation/Recirculation	0.00	42.33	2.67	
DDC Control	0.00	1,574.55	14.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		ı		3.

	TYPICAL SYSTEM POINT AND COST SUMMARY								
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST			
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00			
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00			
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00			
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00			
	TOTAL:	1	3	0	6	\$2,116.00			

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

### **ENERGY CALCULATION PARAMETERS**

BLDG:	0853	BUILDING NAME:	MNT HANGAR AVUM
BLDG:	0853	BUILDING NAME:	MNT HANGAR AVUM

Building UA: 9,332 CONDITIONED SQFT:

CONDITIONED SQFT: 48,112

SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	15	17	0

<b>INPUTS</b>		
Motor HP:	2.00	
HP Effic:	0.78	
Load Factor:	0.80	
CFM-HTG:	3,000	
CFM-CLG:	3,000	
%OA:	20%	
%Area:	5%	
CHILLER CAP (TONS):	0	
KW-TON:	0.00	
BLR CAP INPUT (BTUH):	0	
BLR CAP OUTPUT (BTUH):	0	

### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	960	3,360
HTG HRS ON	1,536	5,376
H/C HRS ON	2,503	8,760
CLG HRS SAVED	2.400	
HTG HRS SAVED	3,840	)
C/H HRS SAVED	6,257	

#### **CONSTANTS**

HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOAUHC:

16.2

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0853 BUILDING NAME: MNT HANGAR AVUM

## ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

0.00 0.00 0.00 3.12 0.00	10,539.88 466.73 0.00 0.00	60.82 0.00 0.00 0.00
0.00 3.12	0.00	0.00
3.12	0.00	
		0.00
0.00		
	17,663.91	17.08
3.12	28,670.53	77.90
0.00	596.93	0.00
0.00	47.03	2.96
0.00	1,749.50	14.04
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		3.
The second secon	0.00 0.00 0.00 0.00 0.00	0.00     596.93       0.00     47.03       0.00     1,749.50       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00

UMCS TUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AJ POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	Ō	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**DATE**: 16-Sep-95

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG: **BUILDING NAME: MNT HANGAR AVUM** 0853

**Building UA:** 9,332 CONDITIONED SQFT:

48,112

#### SYTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32	,		
Weeks of S	ummer: 20			

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	15	17	0

Motor HP:	5.00
HP Effic:	0.41
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	70%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	3,609,000
BLR CAP OUTPUT (BTUH):	2,887,000

#### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON	960	3,360
HTG HRS ON	1,536	5,376
H/C HRS ON	2,503	8,760
CLG HRS SAVED	2,400	I
HTG HRS SAVED	3,840	ĺ
C/H HRS SAVED	6,257	•

ONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0853 BUILDING NAME: MNT HANGAR AVUM

ENERGY CALCULATION SUMMARY

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	28,084.36	0.00
Opt ST/SP	0.00	2,230.66	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	30,315.02	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	20.46
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			20.46

UMCS FUNCTN NO.	TYPICAL SYSTEN  UMCS APPLICATION	DO POINTS	AO POINTS	T SUMMA  DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	Ž	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**DATE:** 16-Sep-95

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0853	BUILDING NAME:	MNT HANGAR AVUM

**Building UA:** 9,332 CONDITIONED SQFT:

48,112

#### SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU		BATTALION	0700-1800	M-F; SAT
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	15	17	0

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0

# HOURS CALCULATIONS

BLR CAP OUTPUT (BTUH):

	HR/YR	HR/YR
CLG HRS ON:	960	3,360
HTG HRS ON:	1,536	5,376
H/C HRS ON:	2,503	8,760
CLG HRS SAVED	2,400	- 
HTG HRS SAVED	3,840	= 
C/H HRS SAVED:	6,257	

#### CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
НОАОНС:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: JM/AJN/AMS

DATE: 16-Sep-95

BLDG: 0853 BUILDING NAME: MNT HANGAR AVUM

ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	S. A. A. S. SERVICE S. ALL MC.
0.00	0.00	0.00	
0.00			
	0.00	0.00	
0.00		0.00	
5.50	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	87.50	0.00	
0.00	0.00	0.00	
4.21	0.00	0.00	
-			3.0
	0.00 0.00 0.00 0.00 0.00 0.00	0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     87.50       0.00     0.00       4.21     0.00	0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     87.50     0.00       0.00     0.00     0.00       4.21     0.00     0.00

UMCS FUNCTN	TYPICAL SYSTEN  UMCS APPLICATION	POINT A	ND COS	T SUMMA	ARY AI	COST
NO.		POINTS	POINTS	POINTS	POINTS	
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:		0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

**DATE:** 16-Sep-95

**ENERGY CALCULATION PARAMETERS** 

BLDG:	0853	BUILDING NAME:	MNT HANGAR AVUM

**Building UA:** 9,332

CONDITIONED SQFT:

**CONSTANTS** 

48,112

16.2

17.5

0 5.67

#### SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-2

#### TYPICAL BUILDING INFORMATION

Catagory Number: Occupancy Days: Construction: Use: Occupancy HRS: M-F; SAT **BATTALION** 0700-1800 7 BRICK AND CMU

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	. 7	7	7	7.	0
REQ STOP:	0	17	17	17	15	17	0

1 10

#### INPUTS 0.00 Motor HP: 0.64 HP Effic: 0.80 Load Factor: 0 CFM-HTG: 0 CFM-CLG: 0% %QA: 0% %Area: 5 CHILLER CAP (TONS):

AVV-1 OIV.	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

960	<u>/R</u> 3,360
960	3 360
	5,000
1,536	5,376
2,503	8,760
2,400	
3,840	
6,257	
	2,503 2,400 3,840

HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305

CHWR:

CNWR:

OAR:

HOAUHC:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: JM/AJN/AMS

**DATE**: 16-Sep-95

BUILDING NAME: MNT HANGAR AVUM

## ENERGY CALCULATION SUMMARY

System Type: 8

BLDG: 0853

System Name: Air cooled DX compressor

System Number: CH-2

<u>FUNCTION</u>	<u>kW/yr k</u>	Wh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	87.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	4.21	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0

UMCS FUNCTI NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO	ND COS AO POINTS	T SUMM/ DI POINTS	ARY  AI  POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	4.	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0853	BUILDING NAME:	MNT HANGAR AVUM

**Building UA:** 9,332 CONDITIONED SQFT:

48,112

#### SYTEM INFORMATION ::

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-3

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	:Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	of Winter:	<b>32</b>		

Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	15	17	0

IN	ы	8 20	a - 3
IN		<b>.</b>	-

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	960	3,360
HTG HRS ON:	1,536	5,376
H/C HRS ON:	2,503	8,760
CLG HRS SAVED:	2,400	- I
HTG HRS SAVED:	3,840	-
C/H HRS SAVED:	6,257	

#### <u>CONSTANTS</u>

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0853 BUILDING NAME: MNT HANGAR AVUM

ENERGY CALGULATION SUMMARY

System Type: 8
System Name: Air cooled DX compressor

System Number: CH-3

<u>FUNCTION</u>	<u>kWiyr</u> .	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0

UMCS FUNCTN NO:	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	AO POINTS	T SUMMA  DI POINTS	IRY AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0853	BUILDING NAME:	MNT HANGAR AVUM	
	Building UA:	9,332	CONDITIONED SQFT:	48,112

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-1

TYPICAL BUILD	ING INFORMATIO	)N			
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU		BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	'SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	15	17	0

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	5,000
CFM-CLG:	0
%OA:	30%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	960	3,360
HTG HRS ON:	1,536	5,376
H/C HRS ON:	2,503	8,760
CLG HRS SAVED:	2,400	
HTG HRS SAVED:	3,840	-
C/H HRS SAVED:	6,257	-

<u>CONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 0853 BUILDING NAME: MNT HANGAR AVUM

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit

System Number: HV-1

<u>kW/yr</u>	kWh/yr	<u>MBtu/yr</u>	MH/yr
0.00	8,702.70	150.34	
0.00	691.23	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	23.91	
0.00	9,393.93	174.24	
0.00	0.00	0.00	
0.00	0.00	11.94	
0.00	0.00	19.66	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         8,702.70           0.00         691.23           0.00         0.00           0.00         0.00           0.00         0.00           0.00         9,393.93           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         8,702.70         150.34           0.00         691.23         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         23.91           0.00         9,393.93         174.24           0.00         0.00         0.00           0.00         0.00         11.94           0.00         0.00         19.66           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

#### LOCATION: FT. RILEY, KS **ENERGY CALCULATION PARAMETERS**

**BUILDING NAME: MNT HANGAR AVUM** BLDG: 0853

9,332 **Building UA:** 

**CONDITIONED SQFT:** 

48,112

SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-2

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU		BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

SYSTEM OPERATING SCHEDULE

20) 10010 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	15	17	0

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,100
CFM-CLG:	0
%OA:	25%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	960	3,360
HTG HRS ON:	1,536	5,376
H/C HRS ON:	2,503	8,760
CLG HRS SAVED	2,400	)
HTG HRS SAVED	3,840	)
C/H HRS SAVED	6,257	<del>,</del>

<u>CONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
нолонс:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0853 BUILDING NAME: MNT HANGAR AVUM

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit

System Number: HV-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,702.70	152.84	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	27.32	
Sub Total	0.00	9,393.93	180.17	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	12.14	
DDC Control	0.00	0.00	22.47	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			214.78	3.0

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO	T SUMM/ DI POINTS	AI POINTS	COST
( 	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0853	BUILDING NAME:	MNT HANGAR AVUM

EDG. 0000 BOILDING NAME. WINT HANGAR AVOID

Building UA: 9,332 CONDITIONED SQFT:

48,112

#### SYTEM INFORMATION ......

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-1

#### TYPICAL BUILDING INFORMATION

Catagory Number	: Construction:	Use:	Occupancy HRS:	Occupancy Days:
	14 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	. 0	0	0.	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	. 0
REQ STOP:	0	17	17	17	15	17	0

<u>nputs</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	7,000
CFM-CLG:	0
%OA:	100%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0

#### **HOURS CALCULATIONS**

BLR CAP OUTPUT (BTUH):

		HR/YR
CLG HRS ON:	960	3,360
HTG HRS ON:	1,536	5,376
H/C HRS ON:	2,503	8,760
CLG HRS SAVED:	2,400	
HTG HRS SAVED:	3,840	
C/H HRS SAVED:	6,257	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

BUILDING NAME: MNT HANGAR AVUM

ENERGY CALCULATION SUMMARY

System Type: 16

BLDG: 0853

System Name: Heating and Ventilating Unit

System Number: MAU-1

FUNCTION	kW/yr	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	8,702.70	0.00
Opt ST/SP	0.00	691.23	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	9,393.93	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	90.71
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	9,393.93	90.71 3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AÎ POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0853	<b>BUILDING NAME:</b>	MNT HANGAR AVUM

CONDITIONED SQFT:

**Building UA:** 9,332 48,112

#### SYTEMINFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-2

#### TYPICAL BUILDING INFORMATION

İ	Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
- 1	14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32 20 Weeks of Summer:

#### SYSTEM OPERATING SCHEDULE

	√SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	15	17	0

0

#### **INPUTS** Motor HP: 3.00 HP Effic: 0.79 Load Factor: 0.80 7,000 CFM-HTG: CFM-CLG: 0 100% %OA: %Area: 15% CHILLER CAP (TONS): 0 KW-TON: 0.00 **BLR CAP INPUT (BTUH):** 0

#### HOURS CALCULATIONS

BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	960	3,360
HTG HRS ON:	1,536	5,376
H/C HRS ON:	2,503	8,760
CLG HRS SAVED:	2,400	
HTG HRS SAVED:	3,840	
C/H HRS SAVED:	6,257	

#### <u>CONSTANTS</u>

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 0853 BUILDING NAME: MNT HANGAR AVUM

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-2

			No. 100 Control of the Commonwealth of the Control
0.00	8,702.70	0.00	
0.00	691.23	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	9,393.93	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	90.71	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00     0.00       0.00     0.00       0.00     0.00       0.00     9,393.93       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00	0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         9,393.93         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         90.71           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	Ö	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

**DATE**: 16-Sep-95

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	0853	BUILDING NAME:	MNT HANGAR AVUM	
	Building UA:	9,332	CONDITIONED SQFT:	48,112

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-3

TYPICAL BUILD	NG INFORMATION	*		The state of the state of
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	4 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of S	ummer: 20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	15	17	0

3.00	Motor HP:
0.79	HP Effic:
0.80	Load Factor:
7,000	CFM-HTG:
(	CFM-CLG:
100%	%OA:
15%	%Area:
(	CHILLER CAP (TONS):
0.00	KW-TON:
(	BLR CAP INPUT (BTUH):
	BLR CAP OUTPUT (BTUH):

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 960 3,360 HTG HRS ON: 1,536 5,376 H/C HRS ON: 2,503 8,760 2,400 CLG HRS SAVED: HTG HRS SAVED: 3,840 C/H HRS SAVED: 6,257

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
НОАОНС:	0
ноаон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 0853 BUILDING NAME: MNT HANGAR AVUM

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-3

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	8,702.70	0.00
Opt ST/SP	0.00	691.23	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	9,393.93	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	90.71
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			90.71

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	O	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

ACA 01-94-D-0033

LOCATION: FT. RILEY, KS PREPARED BY: JM/AJN/AMS

EMC NO: 1406-001

**DATE**: 16-Sep-95

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 0853 BUILDING NAME: MNT HANGAR AVUM

Building UA: 9,332 CONDITIONED SQFT: 48,112

SYTEM INFORMATION:

System Type: 16
System Name: Heating and Ventilating Unit
System Number: MAU-4

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:

14 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: 32

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

MON: TUE: WED: THUR: FRI: SAT: SUN: 0 0 0 0 PRES START: 0 0 24 24 24 24 24 24 24 PRES STOP: 7 0 7 **REQ START:** 0 17 0 17 17 15 **REQ STOP:** 

INPUTS Motor HP: 3.00 HP Effic: 0.79 0.80 Load Factor: 7,000 CFM-HTG: 0 CFM-CLG: 100% %OA: %Area: 15% 0 CHILLER CAP (TONS): 0.00 KW-TON: 0 **BLR CAP INPUT (BTUH):** 0 BLR CAP OUTPUT (BTUH):

**HOURS CALCULATIONS** PRESENT REQUIRED HR/YR HR/YR 3,360 960 CLG HRS ON: 5,376 HTG HRS ON: 1.536 H/C HRS ON: 2,503 8,760 CLG HRS SAVED: 2,400 HTG HRS SAVED: 3,840 6,257 C/H HRS SAVED:

**CONSTANTS HOAUHC:** Ō HOAUH: 0 COAUHC: 0 COAUC: HOAOHC: 0 0 HOAOH: 0 COAOHC: Õ COAOC: DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0 ECHC: 0 0 **NSUCHC:** 0 NSUCC: 0.0000199 DDCCHC: DDCCC: 0.0000526 NSC: 0 DDCH: 64800 305 OPT: 17.5 CHWR: CNWR: 0 OAR: 5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BUILDING NAME: MNT HANGAR AVUM

## ENERGY CALCULATION SUMMARY

System Type: 16

BLDG: 0853

System Name: Heating and Ventilating Unit

System Number: MAU-4

FUNCTION -	<u>kW/yr</u>	kWh/yr	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	8,702.70	0.00
Opt ST/SP	0.00	691.23	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	9,393.93	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	90.71
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	9,393.93	90.71

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	0853	<b>BUILDING NAME:</b>	MNT HANGAR AVUM
BLUG.	0000		

Building UA: 9,332 CONDITIONED SQFT:

48,112

#### SYTEM INFORMATION

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F Weeks of Winter: 32

Weeks of Winter: 32
Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

phill 1971 194 sold the second	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	15	17	0

<u>NPUTS</u>	
Motor HP:	3.00
HP Effic:	0.40
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	70%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	960	3,360
HTG HRS ON:	1,536	5,376
H/C HRS ON:	2,503	8,760
CLG HRS SAVED:	2,400	<b>)</b>
HTG HRS SAVED:	3,840	_ )
C/H HRS SAVED:	6,257	•

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: JM/AJN/AMS

**DATE**: 16-Sep-95

BUILDING NAME: MNT HANGAR AVUM

ENERGY CALCULATION SUMMARY

System Type: 25

0853

**BLDG**:

System Name: Hot water radiation pump

System Number: RAD-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	17,405.19	0.00
Opt ST/SP	0.00	1,382.44	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00,
Night Setback	0.00	0.00	0.00
Sub Total	0.00	18,787.63	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3

UMCS FUNCTN NO:	TYPICAL SYSTEM UMCS APPLICATION	DO POINTS	ND COST AO POINTS	DÍ	RY AL POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	<u> </u>	\$570.00
	TOTAL:		0		1	\$570.00

## BUILDING 1470 AR VEHICLE MAINTENANCE SHOP

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

**BLDG: 1470** BUILDING NAME: AR VEH MNT SHOP

**Building UA:** 9,020 CONDITIONED SQFT:

21,667

#### SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-1

# TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

INPUTS	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

		IR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED:	6,414	

<u>CONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 1470 BUILDING NAME: AR VEH MNT SHOP

ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-1

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
and Safety Alarms TOTAL	4.21	87:50	0.00	3.

UMCS FUNCTN NO.	TYPICAL SYSTEN  UMCS APPLICATION	DO POINTS	AO POINTS	T SUMM/ DI POINTS	ARY AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	IOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95 PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BUILDING NAME: AR VEH MNT SHOP BLDG: 1470

> 9,020 **Building UA:**

CONDITIONED SQFT:

21,667

#### SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-2

#### TYPICAL BUILDING INFORMATION

Occupancy HRS: Occupancy Days: Catagory Number: Construction: Use: M-F; SAT 0700-1800 7 BRICK AND CMU **BATTALION** 

32 Weeks of Winter: 20 Weeks of Summer:

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	. 0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

#### INPUTS: 0.00 Motor HP: 0.64 **HP Effic:** 0.80 Load Factor: 0 CFM-HTG: 0

CFM-CLG:	U
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### **HOURS CALCULATIONS**

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED	3,936	<u>;</u>
C/H HRS SAVED	6,414	Ī

CONSTANTS	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BUILDING NAME: AR VEH MNT SHOP

ENERGY CALCULATION SUMMARY

System Type:

1470

BLDG:

System Name: Air cooled DX compressor

System Number: ACCU-2

FUNCTION	<u>kW/yr</u> +	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	87.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	4.21	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	4.21	87.50	0.00] 3.00

UMCS	TYPICAL SYSTEM					
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	1470	BUILDING NAME:	AR VEH MNT SHOP	
	Building UA:	9,020	CONDITIONED SQFT:	21,667

#### SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number	AHI I-1

TAYPICAL BUILD	ING INFORMATION			and the second second
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0.	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	2,500
CFM-CLG:	2,500
%OA:	25%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR 3,360 **CLG HRS ON:** 900 1,440 5,376 HTG HRS ON: H/C HRS ON: 2,346 8,760 CLG HRS SAVED: 2,460 3,936 HTG HRS SAVED: C/H HRS SAVED: 6,414

CONSTANTS	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 1470 BUILDING NAME: AR VEH MNT SHOP

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

FUNCTION	<b>kW/yr</b>	<u>kWh/yr</u>	<u>MBtulyr</u>	MH/yr
Schedule ST/SP	0.00	2,973.43	64.94	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.62	0.00	0.00	
Night Setback	0.00	15,087.93	26.41	
Sub Total	0.62	18,153.77	91.35	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	1,366.79	21.72	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				3.
Maintenance, Run Time,				
and Safety Alarms	0.62	19.520.57	113.07	3.

MCS NCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 1470 BUILDING NAME: AR VEH MNT SHOP

Building UA: 9,020 CONDITIONED SQFT: 21,667

SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

TYPICAL BUILDING INFORMATION

 Catagory Number:
 Construction:
 Use:
 Occupancy HRS:
 Occupancy Days:

 7BRICK AND CMU
 BATTALION
 0700-1800
 M-F; SAT

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

SUN: MON: TUE: WED: FRI: SAT: PRES START: 0 0 0 0 0 0 PRES STOP: 24 24 24: 24 24 24 24 0 7 7 7 7 0 **REQ START:** 7 16 16 16 16 16 0

0

0

<u>INPUTS</u> Motor HP: 0.33 HP Effic: 0.65 Load Factor: 0.80 CFM-HTG: 2,000 CFM-CLG: 2,000 %OA: 20% 4% %Area: CHILLER CAP (TONS): 0 0.00 KW-TON:

**HOURS CALCULATIONS** 

**BLR CAP INPUT (BTUH):** 

**BLR CAP OUTPUT (BTUH):** 

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	)
HTG HRS SAVED:	3,936	5
C/H HRS SAVED:	6,414	<u>,</u>

CONSTANTS

Der JANAS BONDER STRABBAN	
16.2	HOAUHC:
26.1	HOAUH:
0.000257	COAUHC:
0.00068	COAUC:
33.3	HOAOHC:
53.5	HOAOH:
0.00115	COAOHC:
0.00305	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.00021	ECC:
0.0000795	ECHC:
0.000941	NSUCHC:
0.00249	NSUCC:
0.000233	DDCCHC:
0.000616	DDCCC:
36600	NSC:
30100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 1470 BUILDING NAME: AR VEH MNT SHOP

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

FUNCTION -	<u>kW/yr</u>	. <u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	2,602.57	41.56	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.62	0.00	0.00	
Night Setback	0.00	12,070.34	13.21	
Sub Total	0.62	14,765.32	54.77	
Economizer	0.00	373.08	0.00	
Ventilation/Recirculation	0.00	31.35	1.98	
DDC Control	0.00	1,093.44	10.86	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				3.
Maintenance, Run Time,				
and Safety Alarms	0.62	16,263.19	67.60	. 3.

TYPICAL SYSTEM POINT AND COST SUMMARY								
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	ÃO POINTS	DI POINTS	AI POINTS	COST		
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00		
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00		
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00		
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00		
	TOTAL:	4	3	0	6	\$2,116.00		

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

21,667

**ENERGY CALCULATION PARAMETERS** 

BLDG:	1470	BUILDING NAME:	AR VEH MNT SHOP

DLDG.	1770	DOILDING NAME.	. ALL VELLIMINE OHOL	
	Building UA:	9,020	CONDITIONED SQFT:	7

#### SYTEM INFORMATION ...

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of \	Winter: 32			
Weeks of Su	ımmer: 20	- ).		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	990,000
BLR CAP OUTPUT (BTUH):	792,000

#### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED	2,460	
HTG HRS SAVED	3,936	od I
C/H HRS SAVED:	6,414	~ ·

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 1470 BUILDING NAME: AR VEH MNT SHOP

**ENERGY CALCULATION SUMMARY** 

System Type: 1
System Name: Small hot water boiler

System Number: BLR-1

<u>FUNCTION</u>	kW/yr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	6,023.09	0.00
Opt ST/SP	0.00	466.73	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	6,489.82	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	5.61
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:	4.00
TOTAL	0.00	6,489.82	5.61

UMCS UNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO	T SUMMA  DI  POINTS	ARY  AI  POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 1470 BUILDING NAME: AR VEH MNT SHOP

Building UA: 9,020 CONDITIONED SQFT:

21,667

SYTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CM	U VEH MAINT SHOP	0700-1800	M-F
Weeks o	f Winter:	32		
Weeks of	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

(2000)	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	. 0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	990,000
BLR CAP OUTPUT (BTUH):	792,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED	2,460	- )
HTG HRS SAVED	3,936	5
C/H HRS SAVED	6,414	Ī

0 0 0 0 0
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.17
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0
105
278
161
426
300
600
305
7.5
0
6.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 1470 BUILDING NAME: AR VEH MNT SHOP

**ENERGY CALCULATION SUMMARY** 

System Type: 1
System Name: Small hot water boiler

System Number: BLR-2

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	6,023.09	0.00
0.00	466.73	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	6,489.82	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	5.61
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		4.
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         6,023.09           0.00         466.73           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         6,489.82           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

JM/AJN/AMS PREPARED BY:

#### **ENERGY CALCULATION PARAMETERS**

SHOP

9,020 **Building UA:** 

CONDITIONED SQFT:

21,667

#### SYTEM INFORMATION ...

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-1

#### TYPICALIBUILDING INFORMATION Occupancy Days: Use: Occupancy HRS: Construction: Catagory Number: 0700-1800 M-F 13METAL PANEL AND CMU VEH MAINT SHOP

Weeks of Winter: 20 Weeks of Summer:

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	20.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	22,200
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED	2,460	),
HTG HRS SAVED	3,936	1
C/H HRS SAVED	6,414	

<u>ONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

EMC NO: 1406-001

BUILDING NAME: AR VEH MNT SHOP BLDG: 1470 4

ENERGY CALCULATION SUMMARY

16 System Type:

Heating and Ventilating Unit System Name:

MAU-1 System Number:

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	53,325.88	0.00	
Opt ST/SP	0.00	4,132.21	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	42.53	
Sub Total	0.00	57,458.09	42.53	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	18.31	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		1		3.0
TOTAL	0.00	57,458,09	60.84	3.0

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	1470	BUILDING NAME:	AR VEH MNT SHOP

Building UA: 9,020

CONDITIONED SQFT:

21,667

#### SYTEM INFORMATION

System Type: 21

System Name: HW Unit heater

System Number: UH-1

#### TYPICAL BUILDING INFORMATION

 Catagory Number:
 Construction:
 Use:
 Occupancy HRS:
 Occupancy Days:

 13 METAL PANEL AND CMU
 VEH MAINT SHOP
 0700-1800
 M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

20.200000000000000000000000000000000000	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

0

#### <u>INPUTS</u> Motor HP: 1.50 0.74 HP Effic: Load Factor: 0.80 12,320 CFM-HTG: 0 CFM-CLG: 0% %OA: 55% %Area: 0 CHILLER CAP (TONS): 0.00 KW-TON: BLR CAP INPUT (BTUH): 0

#### HOURS CALCULATIONS

**BLR CAP OUTPUT (BTUH):** 

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON	1,440	5,376
H/C HRS ON	2,346	8,760
CLG HRS SAVED	2,460	)
HTG HRS SAVED	3,936	5
C/H HRS SAVED	6,414	_  -

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
НОАОНС:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95 PREPARED BY: JM/AJN/AMS LOCATION: FT. RILEY, KS

BUILDING NAME: AR VEH MNT SHOP BLDG: 1470

**ENERGY CALCULATION SUMMARY** 

EMC NO: 1406-001

21 System Type:

HW Unit heater System Name:

UH-1 System Number:

<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u>	<u>MH/yr</u>
0.00	4,761.50	0.00	
0.00	368.97	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	467.82	
0.00	5,130.46	467.82	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			0.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00     368.97       0.00     0.00       0.00     0.00       0.00     0.00       0.00     5,130.46       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00	0.00         368.97         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         467.82           0.00         5,130.46         467.82           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO	TYPICAL SYSTE	M POINT A DO POINTS	ND COS AO POINTS	T SUMMA DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95

PREPARED BY: JM/AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	1470	BUILDING NAME:	AR VEH MNT SHOP
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**Building UA:** 9,020

CONDITIONED SQFT: 21,667

EMC NO: 1406-001

#### SYTEM INFORMATION

System Type: 21

System Name: HW Unit heater

System Number: UH-2

# TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: Weeks of Summer:

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:		THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

# INDITO

INPUIS	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	4,800
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON	: 900	3,360
HTG HRS ON	1,440	5,376
H/C HRS ON	2,346	8,760
CLG HRS SAVED	: 2,460	- 
HTG HRS SAVED	3,936	-
C/H HRS SAVED	6,414	-

<u>CONSTANTS</u>	
HOAUHC:	C
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	Ö
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: JM/AJN/AMS

**DATE:** 16-Sep-95

BUILDING NAME: AR VEH MNT SHOP

ENERGY CALCULATION SUMMARY

System Type: 21

BLDG: 1470

System Name: HW Unit heater

System Number: UH-2

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	1,779.55	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	170.12	
Sub Total	0.00	1,917.45	170.12	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		,		0.0
TOTAL	0.00	1,917.45	170.12	. 0.0

UMCS FUNCTN NO.	UMCS APPLICATION	DO . POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

## BUILDING 4010 DENTAL CLINIC

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

15,587

LOCATION: FT. RILEY, KS PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	4010	BUILDING NAME:	DENTAL CLINIC

CONDITIONED

Building UA: 2,715 CONDITIONED SQFT:

SYTEM INFORMATION

System Type: 18

System Name: Dual Duct air handling unit

System Number: AHU-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	0 BRICK AND CMU		DENTAL CLINIC	0800-1700	M-F
Weeks of	Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	. 0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	. 7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

#### **INPUTS** 35.00 Motor HP: 0.90 HP Effic: 0.80 Load Factor: CFM-HTG: 17,560 17,560 CFM-CLG: 40% %OA: 100% %Area: 0 CHILLER CAP (TONS): 0.00 KW-TON: BLR CAP INPUT (BTUH): 0 0 BLR CAP OUTPUT (BTUH):

#### **HOURS CALCULATIONS**

		<u>PRESENT</u> HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED	2,360	
HTG HRS SAVED	3,776	
C/H HRS SAVED	6,153	

#### CONSTANTS

CONSTANTS	
HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
НОАОН:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 4010 BUILDING NAME: DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type: 18

System Name: Dual Duct air handling unit

System Number: AHU-1

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
0.00	194,777.72	2,169.53	artination of the second secon
0.00	7,063.02	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	15,450.32	97.74	
0.00	217,291.06	2,267.27	
0.00	14,283.81	0.00	
0.00	2,592.21	107.54	
0.00	5,447.99	109.41	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			5.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         194,777.72           0.00         7,063.02           0.00         0.00           0.00         0.00           0.00         15,450.32           0.00         217,291.06           0.00         14,283.81           0.00         2,592.21           0.00         5,447.99           0.00         0.00           0.00         0.00           0.00         0.00	0.00         194,777.72         2,169.53           0.00         7,063.02         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         15,450.32         97.74           0.00         217,291.06         2,267.27           0.00         14,283.81         0.00           0.00         2,592.21         107.54           0.00         5,447.99         109.41           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	O	2	\$697.00
28	Direct digital control - Dual Duct AHU	1	7	0	9	\$3,761.00
	Outside air damper ventilation and recirculation control - Dual Duct AHU	0	1	0	0	\$272.00
	Outside air damper economizer control - Dual Duct AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	4010	BUILDING NAME:	DENTAL CLINIC
		T	

Building UA: 2,715 CONDITIONED SQFT: 15,587

#### <u>SYTEM INFORMATION</u>

System Type: 1
System Name: Small hot water boiler
System Number: BLR-1

Catagory Number:	Construction:	!	Use:	Occupancy HRS:	Occupancy Days:
	0 BRICK AND CMU		DENTAL CLINIC	0800-1700	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

20000 all all 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17.	0

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,750,000
BLR CAP OUTPUT (BTUH):	1,400,000

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR 1,000 3,360 CLG HRS ON: 5,376 1,600 HTG HRS ON: 8,760 2,607 H/C HRS ON: CLG HRS SAVED: 2,360 3,776 HTG HRS SAVED: 6,153 C/H HRS SAVED:

<u>NSTANTS</u>	
HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
НОАОН:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: AJN/CWW

BLDG: 4010 BUILDING NAME: DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type:

System Name: Small hot water boiler

System Number: BLR-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>	
Schedule ST/SP	0.00	3,428.27	0.00	2.31
Opt ST/SP	0.00	276.91	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	3,705.18	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	9.92	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			,	4.(

UMCS UNCTN NO:	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	O	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	4010		BUILDING	NAME:	DENTAL CLINIC	
	Building UA:		2,715		CONDITIONED SQFT:	15,587
SYTEM	LINFORMATION				of the control of the	
Marie de la la companya de la compan	System Type:	6				1 (2) (2) (3) (4) (3) (4) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4
	System Name:	Small air cooled	chiller			
	System Number:	CH-1				

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	0 BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: THUR: FRI: SAT: 0 0 PRES START: 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 0 **REQ START:** 0 REQ STOP: 0 17 17 17 17 17 0

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	C
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	80
KW-TON:	1.10
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	)
HTG HRS SAVED:	3,776	5
C/H HRS SAVED:	6,153	3

	50.2 80.7 00121 0.0032 45.3 72.8
COAUHC: 0. COAUC: ( HOAOHC:	00121 0.0032 45.3 72.8
COAUC: ( HOAOHC:	0.0032 45.3 72.8
HOAOHC:	45.3 72.8
<del></del>	72.8
HOAOH:	
COAOHC: (	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
<b>ECC</b> : 0.0	00826
<b>ECHC</b> : 0.0	00312
NSUCHC: 0.0	00143
NSUCC: 0.0	00379
DDCCHC: 0.0	00119
DDCCC: 0.0	00316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

LOCATION: FT. RILEY, KS

BUILDING NAME: DENTAL CLINIC

**ENERGY CALCULATION SUMMARY** 

System Type: System Name:

BLDG: 4010

Small air cooled chiller

System Number:

CH-1

<u>kW/yr</u> +	<u>kWh/yr</u>	MBtu/yr MH/yr	
0.00	8,630.20	0.00	
0.00	1,115.34	0.00	
0.00	0.00	0.00	
2.80	0.00	0.00	
0.00	0.00	0.00	
2.80	9,745.54	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	1,400.00	0.00	
0.00	0.00	0.00	
67.32	0.00	0.00	
		,	4.0
	0.00 0.00 0.00 2.80 0.00 2.80 0.00 0.00	0.00         8,630.20           0.00         1,115.34           0.00         0.00           2.80         0.00           0.00         0.00           2.80         9,745.54           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         1,400.00           0.00         0.00           0.00         0.00	0.00         8,630.20         0.00           0.00         1,115.34         0.00           0.00         0.00         0.00           2.80         0.00         0.00           0.00         0.00         0.00           2.80         9,745.54         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         1,400.00         0.00           0.00         0.00         0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	4010	BUILDING NAME:	DENTAL CLINIC	
	Building UA:	2,715	CONDITIONED SQFT:	15,587

# System Type: 26

System Name: Pump System Number: HWP-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	OBRICK AND CMU	DENTAL CLINIC	0800-1700	M-F

Weeks of Winter: 32 20 Weeks of Summer:

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED	2,360	
HTG HRS SAVED	3,776	
C/H HRS SAVED	6,153	1

<u>ONSTANTS</u>	
HOAUHC:	50.
HOAUH:	80.
COAUHC:	0.0012
COAUC:	0.003
HOAOHC:	45.
нолон:	72.
COAOHC:	0.001
COAOC:	0.004
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00082
ECHC:	0.00031
NSUCHC:	0.00014
NSUCC:	0.00037
DDCCHC:	0.00011
DDCCC:	0.00031
NSC:	3600
DDCH:	4030
OPT:	30
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 4010 BUILDING NAME: DENTAL CLINIC

ENERGY CALCULATION SUMMARY

 System Type:
 26

 System Name:
 Pump

 System Number:
 HWP-1

FUNCTION	kWlyr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	3,256.53	0.00
Opt ST/SP	0.00	263.04	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	3,519.57	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00 • 3.00

UMCS FUNCTI NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	ND COS AO POINTS	T SUMMA DI POINTS	ARY  AI  POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

#### PREPARED BY: AJN/CWW

<b>ENERGY CALCULATION PARAMET</b>	EF	Ε	E	'	•	•	ſ	ĺ	1			=	=	i		1	I	ŀ	١			۱	١	Λ	l	I	1	•	?	3		F				١	١	Ì	Į	I	ı		)	)	)	)	2			F	I	1				l	I		J	Į	١	١	١	١	Ì	I		)	Ì	١	١					ĺ	(	(	į	l	l	ı	Ì		•		ľ	Ī	ĺ	Ì	1	1		•		۱	١	١	١	١	ļ	l	ĺ	ĺ	l	l	l	l	l	ĺ	ĺ	ĺ	ı	4						ı					ŀ		١	l					l	ı	I	I	-						۰	١		
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BLDG:	4010	BUILDING NAME: DENTAL CLINIC

Building UA: 2,715 CONDITIONED SQFT: 15,587

#### SYTEM INFORMATION

System Type: 26
System Name: Pump
System Number: HWP-2

# TYPICAL BUIL DING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 10 BRICK AND CMU DENTAL CLINIC 0800-1700 M-F Weeks of Winter: 32

Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED	2,360	- 
HTG HRS SAVED	3,776	
C/H HRS SAVED	: 6,153	

<u>NSTANTS</u>	
HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
нолон:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

S

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

DATE: 16-Sep-95

BLDG: 4010

BUILDING NAME: DENTAL CLINIC

ENERGY CALCULATION SUMMARY

System Type: 26
System Name: Pump
System Number: HWP-2

<u>FUNCTION</u>	kW/yr	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	3,256.53	0.00
Opt ST/SP	0.00	263.04	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	3,519.57	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.00	3,519.57	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO	T SUMMA DI POINTS	ARY AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	. 0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	4010	BUILDING NAME:	DENTAL CLINIC	
	Building IIA	2 715	CONDITIONED SOFT	15.5

15,587 SYSTEM INFORMATION

System Type: 25 System Name: Hot water radiation pump

System Number: RAD-1

IC 0800-1700	Occupancy Days:
	Occupancy HRS:

Weeks of Winter: 32 Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	60%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760

3,776

6,153

HTG HRS SAVED:

C/H HRS SAVED:

	z zazania karikida 200 Abarranta kinderia 2000 b
HOAUHC:	50
HOAUH:	80
COAUHC:	0.0012
COAUC:	0.003
HOAOHC:	45
НОАОН:	72
COAOHC:	0.001
COAOC:	0.004
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00082
ECHC:	0.00031
NSUCHC:	0.00014
NSUCC:	0.00037
DDCCHC:	0.00011
DDCCC:	0.0003
NSC:	3600
DDCH:	4030
OPT:	30
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 4010 BUILDING NAME: DENTAL CLINIC

#### ENERGY CALCULATION SUMMARY

System Type: 2

System Name: ¡Hot water radiation pump

System Number: RAD-1

<b>FUNCTION</b>	<u>kWiyr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	. 3,466.95	0.00
Opt ST/SP	0.00	280.04	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	3,746.99	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	3,746.99	0.00 3.00

UMCS FUNCTI NO.	TYPICAL SYSTEN  UMCS APPLICATION	M POINT A  DO POINTS	ND COS  AO  POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	<u> </u>	\$570.00
	TOTAL:	1	0	1	1	\$570.00

# **BUILDING 5000 FIRE STATION**

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: AJN

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	5000	BUILDING NAME:	FIRE STATION	
	Building UA:	2,186	CONDITIONED SQFT:	8,400

#### SYTEM INFORMATION .....

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	1 PANEL & METAL BEAM	FIRE STATION	0000-2400	M-F; SAT-SUN
Weeks of	Winter: 32			
Weeks of S	ummer: 20	<u>.</u> 		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0:	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	4,155
CFM-CLG:	4,155
%OA:	20%
%Area:	60%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED	: 0	
HTG HRS SAVED	. 0	Ī
C/H HRS SAVED:	. 0	 !

NSTANTS	
HOAUHC:	(
HOAUH:	. (
COAUHC:	(
COAUC:	
HOAOHC:	(
НОАОН:	(
COAOHC:	(
COAOC:	(
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	(
ECHC:	(
NSUCHC:	(
NSUCC:	(
DDCCHC:	0.000137
DDCCC:	0.000362
NSC:	36400
DDCH:	84900
OPT:	(
CHWR:	17.5
CNWR:	(
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN

BLDG: 5000 BUILDING NAME: FIRE STATION

**ENERGY CALCULATION SUMMARY** 

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	<u> </u>
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	47.74	
Sub Total	0.00	0.00	47.74	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	4,986.50	111.35	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	:			5.00

TYPICAL SYSTEM POINT AND COST SUMMARY  UMCS							
UNCEN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST	
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00	
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00	
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00	
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00	
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	5000	BUILDING NAME:	FIRE STATION	
	Building UA:	2,186	CONDITIONED SQFT:	8,400

SYTEM INFORMATION	
System Type:	16
System Name:	Heating and Ventilating Unit

System Name:	Heating and Ventilating Unit
System Number:	AHU-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
<b>3</b> ,	1 PANEL & METAL BEAM	FIRE STATION	0000-2400	M-F; SAT-SUN
Wooks	of Winter: 32			

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

1.50	Motor HP:
0.74	HP Effic:
0.80	Load Factor:
3,840	CFM-HTG:
C	CFM-CLG:
100%	%OA:
40%	%Area:
(	CHILLER CAP (TONS):
0.00	KW-TON:
(	BLR CAP INPUT (BTUH):
	BLR CAP OUTPUT (BTUH):

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR 3,360 CLG HRS ON: 3,360 5,376 HTG HRS ON: 5,376 8,760 H/C HRS ON: 8,760 0 CLG HRS SAVED: 0 HTG HRS SAVED: C/H HRS SAVED: 0.

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.000137
DDCCC:	0.000362
NSC:	36400
DDCH:	84900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN

BLDG: 5000 BUILDING NAME: FIRE STATION

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit

System Number: AHU-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	31.83	
Sub Total	0.00	0.00	31.83	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	74.24	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				3.
Maintenance, Run Time, and Safety Alarms				************************
TOTAL	0.00	0,00	106.06	3,

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO**: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN

## **ENERGY CALCULATION PARAMETERS**

BLDG:	5000	BUILDING NAME	: FIRE STATION	
	Building UA:	2,186	CONDITIONED SQFT:	8,400

#### SYTEM INFORMATION

System Type:	1	A THE REST OF THE PARTY OF THE	1,100
System Name:	Small hot water boiler		

System	Number: BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	1 PANEL & METAL BEAM	FIRE STATION	0000-2400	M-F; SAT-SUN
Weeks o	f Winter: 32			
Weeks of S	Summer: 20	•		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	0.17
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	750,000
BLR CAP OUTPUT (BTUH):	600,000

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED	: 0	- 
HTG HRS SAVED	: 0	i.
C/H HRS SAVED	: 0	ĺ

<u>CONSTANTS</u>	
HOAUHC:	, 0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.000137
DDCCC:	0.000362
NSC:	36400
DDCH:	84900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN

BLDG: 5000 **BUILDING NAME: FIRE STATION** 

ENERGY CALCULATION SUMMARY

1 System Type:

System Name: Small hot water boiler

System Number: BLR-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	4.25
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.00
TOTAL	0.00	0.00	4.25 4.00

UMCS	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	\RY	
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	5000	BUILDING N	AME: FIRE STATION	
	Building UA:	2,186	CONDITIONED SQFT:	8,400
SYTEM	INFORMATION			
Magagadhan Dalas Jacob Santi	System Type: 8	Committee of the statement of the statem	2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -	
	System Name: Air coole	d DX compressor		
	System Number: CH-1			

Catagory Number:	Constructio	n:	Use:	Occupancy HRS:	Occupancy Days:
	1 PANEL & ME	TAL BEAM	FIRE STATION	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32	•		
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	10
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	- [
HTG HRS SAVED:	0	I
C/H HRS SAVED:	0	r

	CONSTANTS
0	HOAUHC:
. 0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	HOAOH:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0	NSUCHC:
0	NSUCC:
0.000137	DDCCHC:
0.000362	DDCCC:
36400	NSC:
84900	DDCH:
0	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN

BLDG: 5000 BUILDING NAME: FIRE STATION

ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
0.00	.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	175.00	0.00
0.00	0.00	0.00
8.42	0.00	0.00
		3.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         .00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         175.00           0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO	ΑO	T SUMM/ DI POINTS	ARY  AI     POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL	1	0	1	0	\$243,00

## BUILDING 5302 POST OFFICE

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	5302	BUILDING NAME	: POST OFFICE
	D 11.11 114	0.045	

Building UA: 2,645 CONDITIONED SQFT: 12,240

#### SYTEM INFORMATION

System Name: Multizo

System Name: Multizone air handling unit

System Number: AHU-1

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 7 BRICK AND CMU BATTALION 0700-1800 M-F; SAT

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	10	8	8	10
REQ STOP:	0	17	17	17	17	17	12

<u>INPUTS</u>	
Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,660
CFM-CLG:	12,660
%OA:	20%
%Area:	50%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	-
HTG HRS SAVED:	3,936	•
C/H HRS SAVED:	6,414	

16.2	HOAUHC:
26.1	HOAUH:
0.000257	COAUHC:
0.00068	COAUC:
33.3	HOAOHC:
53.5	HOAOH:
0.00115	COAOHC:
0.0030	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.0002	ECC:
0.0000795	ECHC:
0.00094	NSUCHC:
0.00249	NSUCC:
0.000233	DDCCHC:
0.000616	DDCCC:
36600	NSC:
30100	DDCH:
305	OPT:
17.5	CHWR:
(	CNWR:
5.6	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 5302 BUILDING NAME: POST OFFICE

ENERGY CALCULATION SUMMARY

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-1

FUNCTION	kW/yr	<u>kWh/yr</u>	- MBtu/yr	MH/yr
Schedule ST/SP	0.00	38,718.77	263.07	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	76,405.26	48.40	
Sub Total	0.00	116,766.84	311.48	
Economizer	0.00	2,361.61	0.00	
Ventilation/Recirculation	0.00	198.47	12.51	
DDC Control	0.00	6,921.45	39.81	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.
and Safety Alarms TOTAL	0.00	126,248,37	363.80	

	TYPICAL SYSTEM POINT AND COST SUMMARY							
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST		
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00		
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00		
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00		
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00		
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00		
	TOTAL:	1	8	1	11	\$4,509.00		

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95 PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	5302	BUILDING NAM	IE: POST OFFICE	
	Building UA:	2,645	CONDITIONED SQFT:	12,240

#### SYTEM INFORMATION ....

and the second second second second second second	BUILTIAN ACTION
System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILD	ING INFORMATIO	National States	The second secon	1.0
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of	Winter:	32		
Weeks of S	iummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	10	8	8	10
REQ STOP:	0	17	17	17	17	17	12

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	50%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	608,400
BLR CAP OUTPUT (BTUH):	507.000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	-  -  -
HTG HRS SAVED:	3,936	<del>.</del>
C/H HRS SAVED:	6,414	-

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.00025
COAUC:	0.0006
HOAOHC:	33.
нолон:	53.
COAOHC:	0.0011
COAOC:	0.0030
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.0002
ECHC:	0.000079
NSUCHC:	0.00094
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 5302 BUILDING NAME: POST OFFICE

ENERGY CALCULATION SUMMARY

System Type: 1
System Name: Small hot water boiler

System Number: BLR-1

kW/yr	kWh/yr	MBtu/yr MH/yr
0.00	3,394.52	0.00
0.00	263.04	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	3,657.56	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	3.45
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		4.0 3.45
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         3,394.52           0.00         263.04           0.00         0.00           0.00         0.00           0.00         0.00           0.00         3,657.56           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST :
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	O	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG: 5302		BUILDING NA	AME: POST OFFICE	
	Building UA:	2,645	CONDITIONED SQFT:	12,240
YTEM	INFORMATION	Table 198		
•	System Type: 8			7.F
	System Name: Air coole	d DX compressor		
	System Number: CH-1			

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days
	7 BRICK AND CMU		BATTALION	0700-1800	M-F; SAT
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: THUR: FRI: SAT: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 REQ START: 0 8 8 10 8 8 10 REQ STOP: 0 17 17 17 17 17 12

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	54
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	- )
HTG HRS SAVED:	3,936	, ,
C/H HRS SAVED:	6.414	

<u>NSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	. 0.00025
COAUC:	0.00068
HOAOHC:	33.0
НОАОН:	53.5
COAOHC:	0.0011
COAOC:	0.0030
DC DUTY:	0.1
DC DEMAND:	0.17
ECC:	0.0002
ECHC:	0.000079
NSUCHC:	0.00094
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	3010
OPT:	309
CHWR:	17.5
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 5302 BUILDING NAME: POST OFFICE

ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

FUNCTION	<u>kWiyr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	945.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	45.44	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMMA  DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS EMC NO: 1406-001

**CLIENT CNTRCT #:** DACA 01-94-D-0033

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	5302	BUILDING NAME:	POST OFFICE	
	Building UA:	2,645	CONDITIONED SQFT:	12,240

Building UA:	2,645	CONDITIONED S
FORMATION.		
System Type: 25		
System Name: Hot wate	r radiation pump	
System Number: RAD-1		

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	· 0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	10	8	8	10
REQ STOP:	0	17	17	17	17	17.	12

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	50%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	

# HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	*
HTG HRS SAVED:	3,936	•
C/H HRS SAVED:	6,414	

<u>ONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

**Chiller Demand Limit** 

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

0.00

BLDG: 5302 BUILDING NAME: POST OFFICE

**ENERGY CALCULATION SUMMARY** 

System Type: 25
System Name: Hot water radiation pump
System Number: RAD-1

MH/yr **FUNCTION** kW/yr kWh/yr MBtu/yr 0.00 3,394.52 0.00 Schedule ST/SP 0.00 263.04 Opt ST/SP 0.00 0.00 0.00 0.00 **Duty Cycle** 0.00 **Demand Limit** 0.00 0.00 0.00 0.00 0.00 Night Setback 0.00 0.00 3,657.56 Sub Total 0.00 0.00 0.00 **Economizer** 0.00 0.00 0.00 Ventilation/Recirculation 0.00 0.00 **DDC Control** 0.00 HW OA Reset 0.00 0.00 0.00 0.00 0.00 0.00 **Chilled Water Reset** 0.00 0.00 0.00 Condenser Water Reset

Remote Monitoring,
Maintenance, Run Time,
and Safety Alarms
TOTAL 0.00 3,657.56 0.00 3.00

0.00

0.00

UMES FUNCTI NO.	TYPICAL SYSTEN  UMCS APPLICATION	M POINT A  DO  POINTS	AND COS AO POINTS	T SUMM/ DI POINTS	ARY AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
	TOTAL:	1	0	1	1	\$570.00

# **BUILDING 5309 GUEST HOUSE**

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	5309	BUILDING NAME:	GUEST HOUSE
	Building UA:	6,555	CONDITIONED SQFT:

**Building UA:** 

CONDITIONED SQFT:

23,784

#### SYTEM INFORMATION .

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU		BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

Weeks of Summer:

and made a file interfel for a first over the second and a first and a second	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	. 0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	3.00
HP Effic:	0.72
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	O
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,255,000
BLR CAP OUTPUT (BTUH):	1,004,000

	REQUIRED HR/YR	PRESENT HR/YR	
CLG HRS ON:	3,360	3,	360
HTG HRS ON:	5,376	5,	376
H/C HRS ON:	8,760	8,	760
CLG HRS SAVED	. 0	-  -  -	
HTG HRS SAVED	. 0		
C/H HRS SAVED	: C	- )	

<u>ONSTANTS</u>	
HOAUHC:	
HOAUH:	
COAUHC:	
COAUC:	
HOAOHC:	
HOAOH:	
COAOHC:	
COAOC:	
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	37715
ECHC:	
NSUCHC:	
NSUCC:	
DDCCHC:	0.000055
DDCCC:	0.00014
NSC:	2000
DDCH:	3390
OPT:	
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 5309 BUILDING NAME: GUEST HOUSE

## ENERGY CALCULATION SUMMARY

System Type:

System Name: Small hot water boiler

System Number: BLR-1

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	7.12
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		4.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         .00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	O	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 13-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 5309	BUILDING NA	ME: GUEST HOUSE	
Building UA:	6,555	CONDITIONED SQFT:	23,784
System Type:	3		
System Name:	Small steam boiler		
System Number:	BLR-2		

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter:	32
Weeks of Summer:	20

asifindres.	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)				44.4		- 4
***************************************	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	315,000
BLR CAP OUTPUT (BTUH):	245,700

	<u> </u>		<b>≨</b> e
		REQUIRED HR/YR	PRESENT HR/YR
CL	G HRS ON:	3,360	3,360
HT	G HRS ON:	5,376	5,376
H/	C HRS ON:	8,760	8,760
CLG H	RS SAVED:	0	
HTG HI	RS SAVED:	0	
C/H HI	RS SAVED:	O	]

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
НОАОНС:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001 **DATE:** 13-Dec-95

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

PREPARED BY: AJN/CWW

LOCATION: FT. RILEY, KS

BLDG: 5309

BUILDING NAME: GUEST HOUSE THE PARTICULAR OF SUMMERS AND SECOND

21 (A. 14 A.)	
System Type:	3
System Name:	Small steam boiler
System Number:	BLR-2

	SACRESKO OF THE	kWhyt.	AS ENDERONE CONTRACTOR	er en en en en en en en en en en en en en
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.0

			10.400			
	Mess Palic Tribalis		Vanas		ROLL S	
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	ware/it/vir				77	è Signan j

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	5309	BUILDING NAME:	: GUES	ST HOUSE

CONDITIONED SQFT: 23,784 **Building UA:** 6,555

#### SYTEM INFORMATION

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

#### TYPICAL BUILDING INFORMATION

Use: Catagory Number: Occupancy HRS: Occupancy Days: Construction: 5 BRICK AND CMU **BARRACKS** 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32 20 Weeks of Summer:

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	_24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

#### **INPUTS** Motor HP: 5.00 HP Effic: 0.82 0.80 Load Factor:

CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	50
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

1		REQUIRED HR/YR	PRESENT HR/YR
	CLG HRS ON:	3,360	3,360
	HTG HRS ON	5,376	5,376
	H/C HRS ON:	8,760	8,760
	CLG HRS SAVED	: C	,
	HTG HRS SAVED	: C	
	C/H HRS SAVED	: C	

#### CONSTANTS

<u>CUNSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	. 0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	C
CHWR:	17.5
CNWR:	C
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 5309 BUILDING NAME: GUEST HOUSE

**ENERGY CALCULATION SUMMARY** 

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

0.00	.00	
	.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
2.80	0.00	0.00
0.00	0.00	0.00
2.80	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	875.00	0.00
0.00	0.00	0.00
42.08	0.00	0.00
		4.0
	2.80 0.00 2.80 0.00 0.00 0.00 0.00 0.00	2.80 0.00 0.00 0.00 2.80 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 875.00 0.00 0.00 42.08 0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	O	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 5309	BUILDING NA	ME: GUEST HOUSE	
Building U/	A: 6,555	CONDITIONED SQFT:	23,784
YTEM INFORMATIO	N .		
System Typ	<b>∌</b> : 26		
System Nam	e: Pump		
System Numbe	r: HWP-1		

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S		20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

3.00	Motor HP:
	Motor ne:
0.79	HP Effic:
0.80	Load Factor:
0	CFM-HTG:
C	CFM-CLG:
0%	%OA:
0%	%Area:
C	CHILLER CAP (TONS):
0.00	KW-TON:
C	BLR CAP INPUT (BTUH):
C	BLR CAP OUTPUT (BTUH):

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	C	<u>,</u>
HTG HRS SAVED	C	j.
C/H HRS SAVED:		Ĵ

<u>CONSTANTS</u>	
HOAUHC:	, 0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

System Name: System Number:

TOTAL

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

HWP-1

PREPARED BY: AJN/CWW

BLDG: 5309	BUILDING NA	AME: GUEST HOUSE
	ENERGY CALCU	LATION SUMMARY
System Type:	26	
System Name:	Pump	!

FUNCTION	kWlyr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0

UMCS FUNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	POINT A  DO POINTS	AO	DI	RY AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0 %	\$386.00

0.00 0.00 0.00 3.00

## BUILDING 5315 MORRIS HILL CHAPEL

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	5315	BUILDING NAME:	MORRIS HILL CHAPEL	
	Building UA:	6,485	CONDITIONED SQFT:	19,748

#### SYTEM INFORMATION System Type: 15

System Name: Small Single Zone air handling unit System Number: AHU-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days
Catagory Number:	8 BRICK AND CMU		CHURCH	0700-1800	SAT-SUN
Weeks (	f Winter:	32			
Weeks of		32 20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	7	7	7	7	7	10
REQ STOP:	13	21	21	21	21	21	19

<u>INPUTS</u>	
Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	13,500
CFM-CLG:	13,500
%OA:	20%
%Area:	40%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR 3,360 1,660 CLG HRS ON: 5,376 2,656 HTG HRS ON: 4,328 8,760 H/C HRS ON: 1,700 CLG HRS SAVED: 2,720 HTG HRS SAVED: C/H HRS SAVED: 4,432

<u>CONSTANTS</u>	
HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1
НОАОН:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 5315 BUILDING NAME: MORRIS HILL CHAPEL

ENERGY CALCULATION SUMMARY

System Type: 15

。 第一章

System Name: Small Single Zone air handling unit

System Number: AHU-1

00 00 00 9 00 19 00 00	34,969.21 2,121.49 0.00 0.00 12,086.45 49,177.16 7,069.55 284.93	201.04 0.00 0.00 0.00 264.59 465.63 0.00 13.83	
90 90 90 90	0.00 0.00 12,086.45 49,177.16 7,069.55 284.93	0.00 0.00 264.59 465.63 0.00	
9 00 9 00	0.00 12,086.45 49,177.16 7,069.55 284.93	0.00 264.59 465.63 0.00	
9 9 00	12,086.45 49,177.16 7,069.55 284.93	264.59 465.63 0.00	
9 00 00	<b>49,177.16</b> 7,069.55 284.93	<b>465.63</b> 0.00	
00	7,069.55 284.93	0.00	
00	284.93		
		13.83	
0	24.007.00		
-	34,237.68	144.49	
00	0.00	0.00	
00	0.00	0.00	
00	0.00	0.00	
Ю	0.00	0.00	
	:		3.00
0	00	0.00	0.00

	TYPICAL SYSTEM POINT AND COST SUMMARY						
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST	
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00	
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00	
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00	
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00	
	TOTAL:	1	3	0	6	\$2,116.00	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	5315	BUILDING NAME:	MORRIS HILL CHAPEL

CONDITIONED SQFT: 19,748 **Building UA:** 6,485

#### SYTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

#### TYPICAL BUILDING INFORMATION Construction: Use: Catagory Number: Occupancy HRS: Occupancy Days: 8 BRICK AND CMU CHURCH 0700-1800 SAT-SUN Weeks of Winter: 32

#### SYSTEM OPERATING SCHEDULE

Weeks of Summer:

MINISTER CONTRACTOR CO	,SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24.	24	24	24	24
REQ START:	9	7	7	7	7	7	10
REQ STOP:	13	21	21	21	21	21	19

20

<u>inputs</u>	
Motor HP:	7.25
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0'
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,743,000
BLR CAP OUTPUT (BTUH):	1,516,000

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		
HTG HRS ON:	2,656	5,376
H/C HRS ON:	4,328	8,760
CLG HRS SAVED	1,700	)
HTG HRS SAVED	2,720	)
C/H HRS SAVED:	4,432	

CONSTANTS	
HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1
НОАОН:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95

EMC NO: 1406-001

PREPARED BY: AJN/CWW

BLDG: 5315

BUILDING NAME: MORRIS HILL CHAPEL

ENERGY CALCULATION SUMMARY

System Type:

Small hot water boiler System Name:

BLR-1 System Number:

<u>FUNCTION</u>	kW/yr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	15,932.62	0.00
Opt ST/SP	0.00	1,786.56	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	17,719.18	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	9.88
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.0
TOTAL	0.00	17,719.18	9.88 4.0

IMCS INCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	O	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

**DATE:** 16-Sep-95

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	5315	BUILDING NAME:	MORRIS HILL CHAPEL

**Building UA:** 6,485 CONDITIONED SQFT:

19,748

#### SYTEM INFORMATION .....

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

TYPICAL BUILD Catagory Number:	ING INFORMATIO	NUse:		Occupancy HRS:	Occupancy Days:
Catagory Number.	Constituction.	USE.		Occupancy nks.	Occupancy Days.
	8 BRICK AND CMU	CHURC	H	0700-1800	SAT-SUN
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0.	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	7	7	7	7	7	10
REQ STOP:	13	21	21	21	21	21	19

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	61
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# **HOURS CALCULATIONS**

I	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,660	3,360
HTG HRS ON:	2,656	5,376
H/C HRS ON	4,328	8,760
CLG HRS SAVED	1,700	
HTG HRS SAVED	2,720	- !
C/H HRS SAVED:	4,432	

CONSTANTS	
HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1
НОАОН:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	17.5
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 5315 BUILDING NAME: MORRIS HILL CHAPEL

#### ENERGY CALCULATION SUMMARY

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	6,216.67	0.00
0.00	1,115.34	0.00
0.00	0.00	0.00
2.80	0.00	0.00
0.00	0.00	0.00
2.80	7,332.01	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	1,067.50	0.00
0.00	0.00	0.00
51.33	0.00	0.00
		4.0
	0.00 0.00 0.00 2.80 0.00 2.80 0.00 0.00 0.00 0.00 0.00 0.00	0.00         6,216.67           0.00         1,115.34           0.00         0.00           2.80         0.00           0.00         0.00           2.80         7,332.01           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         1,067.50           0.00         0.00

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	ARY	
UMCS FUNCTN NO:	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
	TOTAL:	2	0	3	2	\$1,481.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	5315	BUILDING NAME:	MORRIS HILL CHAPEL	
	Building UA:	6,485	CONDITIONED SQFT:	19,748

#### SYTEM INFORMATION

System Type: 6

System Name: Small air cooled chiller

System Number: CH-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	8 BRICK AND CMU	CHURCH	0700-1800	SAT-SUN
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	7	7	7	7	7	10
REQ STOP:	13	21	21	21	21	21	19

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	C
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	61
KW-TON:	1.10
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	(

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,660	3,360
HTG HRS ON:	2,656	5,376
H/C HRS ON	4,328	8,760
CLG HRS SAVED	1,700	)
HTG HRS SAVED	2,720	)
C/H HRS SAVED	4,432	) -

1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	MISSISSEE OF A SEASON OF
HOAUHC:	16.8
HOAUH:	27
COAUHC:	- 0.000346
COAUC:	0.000915
HOAOHC:	71.1
HOAOH:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BUILDING NAME: MORRIS HILL CHAPEL BLDG: 5315

ENERGY CALCULATION SUMMARY

System Type:

System Name: Small air cooled chiller

System Number: CH-2

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	6,216.67	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.80	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.80	7,332.01	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	1,067.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	51.33	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			:	4.00
TOTAL	54.13	8,399.51	0.00	4.00

MCS NCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	5315		BUILDING	NAME:	MORRIS HILL CHAPEL	
	Building UA:		6,485	====	CONDITIONED SQFT:	19,748
YTEN	LINFORMATION			4		
Carried States of the Contract	g verstaan kentitaan <b>kirittä</b> ssä valtaan kassa valtaataan kai kanta valta kasta kanta kanta kanta kanta kanta ka Na taritaan kanta kanta kanta kanta kanta kanta kanta kanta kanta kanta kanta kanta kanta kanta kanta kanta ka					
	System Type:	6				Contraction of the second seco
	System Type: System Name:		oled chiller			i Magaaliga Agamaya in 1994 - Awarin da i i i i i magaaliga aalaa in inaada

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	8 BRICK AND CMU	CHURCH	0700-1800	SAT-SUN
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

SYSTEM OPERA	TING S	CHEDUI	E	FEMBUSE				
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:	
PRES START:	0	0	0	0	0	0	0	
PRES STOP:	24	24	24	24	24	24	24	
REQ START:	9	7	7	7	7	7	10	
REQ STOP:	13	21	21	21	21	21	19	

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	11
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,660	3,360
HTG HRS ON:	2,656	5,376
H/C HRS ON:	4,328	8,760
CLG HRS SAVED:	1,700	-
HTG HRS SAVED:	2,720	i
C/H HRS SAVED:	4,432	-

CONSTANTS	
HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1
НОАОН:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 5315 BUILDING N

BUILDING NAME: MORRIS HILL CHAPEL ENERGY CALCULATION SUMMARY

System Type: 6

System Name:

Small air cooled chiller

System Number: CH-3

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/vr
Schedule ST/SP	0.00	2,056.54	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.93	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.93	2,425.51	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	183.75	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	8.84	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	ÄI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	5315	BUILDING NAME:	MORRIS HILL CHAPEL	
	Building UA:	6,485	CONDITIONED SQFT:	19,748

#### SYTEM INFORMATION -

System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU	ADMINISTRATION	0600-1700	M-F
Weeks o	f Winter:	32		
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	. 0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	7.	7	7	7	7	10
REQ STOP:	13	21	21	21	21	21	19

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	7,200
CFM-CLG:	7,200
%OA:	15%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS REQUIRED HR/YR PRESENT HR/YR CLG HRS ON: 1,660 3,360 HTG HRS ON: 2,656 5,376 H/C HRS ON: 4,328 8,760

1,700

2,720

4,432

CLG HRS SAVED:

HTG HRS SAVED:

C/H HRS SAVED:

CONSTANTS	
HOAUHC:	O
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 5315 BUILDING NAME: MORRIS HILL CHAPEL

ENERGY CALCULATION SUMMARY

System Type: 19
System Name: Fan coil unit

System Number: FC-1

kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	3,822.40	0.00
0.00	263.04	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	5,616.41	14.14
0.00	9,701.85	14.14
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
	:	0.0 14.14 0.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         3,822.40           0.00         263.04           0.00         0.00           0.00         0.00           0.00         5,616.41           0.00         9,701.85           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMM/ DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	O	1	2	\$1,213.00
	TOTAL:	4	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	5315	BUILDING NAME:	MORRIS HILL CHAPEL	
	Building UA:	6,485	CONDITIONED SQFT:	19,748

SYTEM INFORMATION		
System Type:	19	
System Name:	Fan coil unit	
System Number:	FC-2	

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU		ADMINISTRATION	0600-1700	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20	·		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	7	7	7	7	7	10
REQ STOP:	13	21	21	21	21	21	19

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	8,000
CFM-CLG:	8,000
%OA:	15%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	1,660	3,360
HTG HRS ON:	2,656	5,376
H/C HRS ON:	4,328	8,760
CLG HRS SAVED:	1,700	
HTG HRS SAVED:	2,720	
C/H HRS SAVED:	4,432	

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	. 0
COAUC:	0
HOAOHC:	0
ноаон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 5315 BUILDING NAME: MORRIS HILL CHAPEL

ENERGY CALCULATION SUMMARY

System Type: 19

System Name: Fan coil unit

System Number: FC-2

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	3,822.40	0.00
Opt ST/SP	0.00	263.04	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	6,240.46	16.96
Sub Total	0.00	10,325.90	16.96
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			0.
TOTAL	0.00	10,325.90	16.96 0.

UMES FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	I POINT A  DO POINTS	ND COS AO POINTS	T SUMM/ DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	O	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	5315	BUILDING NAME:	MORRIS HILL CHAPEL	
	Building UA:	6,485	CONDITIONED SQFT:	19,748

#### SYTEM INFORMATION

System Type:	19
System Name:	Fan coil unit
System Number:	FC-3

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU		ADMINISTRATION	0600-1700	M-F
Weeks of	Winter:	32			
Weeks of S	ummer:	20	•		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	,, 0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	7	7	7	7	7	10
REQ STOP:	13	21	21	21	21	21	19

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS REQUIRED PRESENT

	HR/YR	HR/YR	1
CLG HRS ON	:	1,660	3,360
HTG HRS ON	:	2,656	5,376
H/C HRS ON	•	4,328	8,760
CLG HRS SAVED	:	1,700	
HTG HRS SAVED	•	2,720	
C/H HRS SAVED	:	4,432	

<u>CONSTANTS</u>	
HOAUHC:	, 0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67
· · · · · · · · · · · · · · · · ·	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 5315 BUILDING NAME: MORRIS HILL CHAPEL

**ENERGY CALCULATION SUMMARY** 

System Type: 19

System Name: Fan coil unit

System Number: FC-3

FUNCTION :	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	3,822.40	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	2,730.20	11.31	
Sub Total	0.00	6,815.64	11.31	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	6,815.64	11.31	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	5315	BUILDING NAME:	MORRIS HILL CHAPEL	
	Building UA:	6,485	CONDITIONED SQFT:	19,748
YTEM	INFORMATION			
	System Type: 26			
	System Name: Pump	)		
	System Number: HWP-	.1		

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	8 BRICK AND CMU	CHURCH	0700-1800	SAT-SUN
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	7	7		7.	7.	10
REQ STOP:	13	21	21	21	21	21	19

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,660	3,360
HTG HRS ON:	2,656	5,376
H/C HRS ON:	4,328	8,76
CLG HRS SAVED:	1,700	)
HTG HRS SAVED:	2,720	)
C/H HRS SAVED:	4,432	2

CONSTANTS	
HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1
НОАОН:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 5315  BUILDING NAME: MORRIS HILL CHAPE  ENERGY CALCULATION SUMMARY
DEDG. 5515
ENERGY CALCULATION SUMMARY

 System Type:
 26

 System Name:
 Pump

 System Number:
 HWP-1

<u>kW/yr</u>	kWh/yr	MBtu/yr I	AH/yr
0.00	3,290.46	0.00	
0.00	368.97	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	3,659.43	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         3,290.46           0.00         368.97           0.00         0.00           0.00         0.00           0.00         0.00           0.00         3,659.43           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         3,290.46         0.00           0.00         368.97         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMMA  DI POINTS	ARY AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: AJN/CWW

**DATE**: 16-Sep-95

19,748

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	5315	BUILDING NAME: MORRIS HILL CHAPEL

Building HA: C 405

Building UA: 6,485 CONDITIONED SQFT:

SYTEM INFORMATION

System Type: 26
System Name: Pump

System Number: HWP-2

#### TYPICAL BUILDING INFORMATION

 Catagory Number:
 Construction:
 Use:
 Occupancy HRS:
 Occupancy Days:

 8 BRICK AND CMU
 CHURCH
 0700-1800
 SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	7	7	7	7	7	10
REQ STOP:	13	21	21	21	21	21	19

#### INPUTS

0.75
0.66
0.80
0
0
0%
0%
0
0.00
0
0

#### HOURS CALCULATIONS

:	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,660	3,360
HTG HRS ON:	2,656	5,376
H/C HRS ON:	4,328	8,760
CLG HRS SAVED:	1,700	
HTG HRS SAVED:	2,720	•
C/H HRS SAVED:	4,432	

#### <u>CONSTANTS</u>

HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1
НОАОН:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

BLDG: 5315

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: AJN/CWW

**DATE**: 16-Sep-95

BUILDING NAME: MORRIS HILL CHAPEL

ENERGY CALCULATION SUMMARY

 System Type:
 26

 System Name:
 Pump

 System Number:
 HWP-2

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	1,844.65	0.00
Opt ST/SP	0.00	206.85	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	2,051.50	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
and Safety Alarms TOTAL	0.00	2,051.50	3.0

UMCS FUNCTI NO.	TYPICAL SYSTEN UMCS APPLICATION	POINT A  DO  POINTS	ND COST AO POINTS	DI	RY AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

## BUILDING 5800 YOUTH CENTER

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 5800 BUILDING NAME: YOUTH CTR

Building UA: 2,572 CONDITIONED SQFT: 21,560

SYTEM INFORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

 Catagory Number:
 Construction:
 Use:
 Occupancy HRS:
 Occupancy Days:

 16 BRICK AND CMU
 GYMNASIUM
 0600-2200
 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

TUE: SUN: MON: FRI: THUR: SAT: WED: PRES START: 0 0 0 0 0 0 24 PRES STOP: 24 24 24 24 24 24 **REQ START:** 0 6 5 5 5 8 **REQ STOP:** 22 19 19 19 19

<u>inputs</u>	
Motor HP:	15.00
HP Effic:	0.87
Load Factor:	0.80
CFM-HTG:	12,300
CFM-CLG:	12,300
%OA:	10%
%Area:	60%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### **HOURS CALCULATIONS**

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,260	3,360
HTG HRS ON:	2,016	5,376
H/C HRS ON	3,285	8,760
CLG HRS SAVED	2,100	<u>.</u>
HTG HRS SAVED	3,360	)
C/H HRS SAVED	5,475	·

#### **CONSTANTS** HOAUHC: 20.9 HOAUH: 33.6 COAUHC: 0.000213 COAUC: 0.000562 HOAOHC: 27.8 HOAOH: 44.7 COAOHC: 0.000391 COAOC: 0.00103 DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0.000022 ECHC: 0.0000083 NSUCHC: 0.000637 **NSUCC:** 0.00168 DDCCHC: 0.0000143 DDCCC: 0.0000378 NSC: 425000 DDCH: 11000 OPT: 305 CHWR: 17.5 CNWR: 0 OAR: 5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 5800 BUILDING NAME: YOUTH CTR

## ENERGY CALCULATION SUMMARY

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-1

FUNCTION	<u>kWlyr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	57,965.19	140.75
Opt ST/SP	0.00	3,149.20	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	21.06	0.00	0.00
Night Setback	0.00	42,897.17	655.86
Sub Total	21.06	104,011.57	796.61
Economizer	0.00	335.37	0.00
Ventilation/Recirculation	0.00	79.91	7.84
DDC Control	0.00	577.80	16.98
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			821.42

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 5800 B	BUILDING NAME:	YOUTH CTR
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Building UA: 2,572 CONDITIONED SQFT: 21,560

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	6 BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	ummer.	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRi:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	5	5	5	8	8
REQ STOP:	0	22	19	19	19	2	19

INPUTS	
Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	8,020
CFM-CLG:	8,020
%OA:	15%
%Area:	40%
CHILLER CAP (TONS):	Ō
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,260	3,360
HTG HRS ON:	2,016	5,376
H/C HRS ON:	3,285	8,760
CLG HRS SAVED:	2,100	
HTG HRS SAVED:	3,360	•
C/H HRS SAVED:	5,475	-

NSTANTS	8088 av 20070 - 2000 <b>%</b> Lin
HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
НОАОН:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 5800 BUILDING NAME: YOUTH CTR

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

FUNCTION .	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	30,892.80	137.66
Opt ST/SP	0.00	1,642.82	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	10.99	0.00	0.00
Night Setback	0.00	27,970.35	437.24
Sub Total	10.99	60,505.97	574.90
Economizer	0.00	218.67	0.00
Ventilation/Recirculation	0.00	78.15	7.67
DDC Control	0.00	376.74	11.32
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
•			
Maintenance, Run Time, and Safety Alarms	10.99	61,179.53	593.88

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO	T SUMMA DI POINTS	AI POINTS	COST
	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	5800	BUILDING	NAME: YOUTH CTR	
	Building UA:	2,572	CONDITIONED SQFT:	21,560

SYTEMINFORMATION	
System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

TYPICAL BUILD	ING INFORMATION			
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	6 BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

SYSTEM OPERA	ating s	CHEDUI	Æ				
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	5	5	5	8	8
REQ STOP:	0	22	19	19	19	2	19

Motor HP:	2.17
HP Effic:	0.71
Load Factor:	0.80
CFM-HTG:	
CFM-CLG:	(
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	(
KW-TON:	0.00
BLR CAP INPUT (BTUH):	600,000
BLR CAP OUTPUT (BTUH):	480,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,260	3,360
HTG HRS ON:	2,016	5,376
H/C HRS ON:	3,285	8,760
CLG HRS SAVED:	2,100	)
HTG HRS SAVED:	3,360	ī.
C/H HRS SAVED:	5,475	- 1

HOAUHC:	20.
HOAUH:	33.
COAUHC:	0.00021
COAUC:	0.00056
HOAOHC:	27.
НОАОН:	44.
COAOHC:	0.00039
COAOC:	0.0010
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00002
ECHC:	0.000008
NSUCHC:	0.00063
NSUCC:	0.0016
DDCCHC:	0.000014
DDCCC:	0.000037
NSC:	42500
DDCH:	1100
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 5800 BUILDING NAME: YOUTH CTR

ENERGY CALCULATION SUMMARY

System Type:

System Name: Small hot water boiler

System Number: BLR-1

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	6,128.72	0.00
Opt ST/SP	0.00	556.33	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	6,685.04	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	3.40
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.00
TOTAL	0.00	6,685.04	3.40

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS:	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	. <b>O</b>	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	5800	BUILDING NAME:	YOUTH CTR	
	Building UA:	2,572	CONDITIONED SQFT:	21,560

## SYTEM INFORMATION ....

System Type: 1

System Name: Small hot water boiler

System Number: BLR-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	16 BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

## SYSTEM OPERATING SCHEDULE

Control and Control and Control and Control	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	5	5	5	8	8
REQ STOP:	0	22	19	19	19	2	19

Motor HP:	0.17
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	
CFM-CLG:	
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	600,000
BLR CAP OUTPUT (BTUH):	480,000

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR 3,360 CLG HRS ON: 1,260 2,016 5,376 HTG HRS ON: 8,760 H/C HRS ON: 3,285 2,100 **CLG HRS SAVED:** 3,360 HTG HRS SAVED: 5,475 C/H HRS SAVED:

HOAUHC:	20.9
	33.6
HOAUH:	
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
НОАОН:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	(
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 5800 BUILDING NAME: YOUTH CTR

ENERGY CALCULATION SUMMARY

System Type: 1
System Name: Small hot water boiler
System Number: BLR-2

0.00 0.00 0.00 0.00 0.00 0.00	532.64 48.35 0.00 0.00 0.00 580.99	0.00 0.00 0.00 0.00 0.00 0.00
0.00 0.00 0.00 0.00	0.00 0.00 0.00 580.99	0.00 0.00 0.00 0.00
0.00 0.00 <b>0.00</b>	0.00 0.00 <b>580.99</b>	0.00 0.00 <b>0.00</b>
0.00	0.00 <b>580.99</b>	0.00
0.00	580.99	0.00
0.00	0.00	0.00
	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	3.40
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		4.00
	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	5800	BUILDING NAME:	YOUTH CTR	
DLUG.	3000	DOILDING HAME.	1001110111	

Building UA: 2,572

CONDITIONED SQFT: 21,560

#### SYTEM INFORMATION

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	6 BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	Summer:	20		

## SYSTEM OPERATING SCHEDULE

2.00-000-00-00-00-00-00-00-00-00-00-00-00	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	5	5	5	8	8
REQ STOP:	0	22	19	19	19	2	19

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	C
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	54
KW-TON:	1.10
BLR CAP INPUT (BTUH):	
BLR CAP OUTPUT (BTUH):	

## HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,26	0 3,360
HTG HRS ON:	2,01	6 5,376
H/C HRS ON:	3,28	5 8,760
CLG HRS SAVED	2,10	0
HTG HRS SAVED	3,36	0
C/H HRS SAVED	5,47	5

CONSTANTS	
HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
нолон:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 5800 BUILDING NAME: YOUTH CTR

**ENERGY CALCULATION SUMMARY** 

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

		<u>MBtu/yr</u> <u>MH/yr</u>
0.00	4,759.29	0.00
0.00	691.23	0.00
0.00	0.00	0.00
1.73	0.00	0.00
0.00	0.00	0.00
1.73	5,450.52	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	939.75	0.00
0.00	0.00	0.00
45.19	0.00	0.00
		4.0
	0.00 0.00 1.73 0.00 1.73 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00     691.23       0.00     0.00       1.73     0.00       0.00     0.00       1.73     5,450.52       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     939.75       0.00     0.00       45.19     0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	ĀĪ POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

**DATE:** 16-Sep-95

## **ENERGY CALCULATION PARAMETERS**

BLDG:	5800	BUILDING NAME:	YOUTH CTR

**Building UA:** 2,572 CONDITIONED SQFT: 21,560

SYTEM INFORMATION ...

System Type: 26 System Name: Pump

System Number: HWP-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
16 E	BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter: 32 Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	5.	5	5	8	8
REQ STOP:	0	22	19	19	19	2	19

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOU	<u>RS C</u>	<u>ALC</u>	UL	<b>VTIC</b>	<b>SNC</b>
\$250 APP W/82.1		00 % (4) O 15/4	38(\$5") 1 A.M.	a Right and	Witis Pul

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,260	3,360
HTG HRS ON:	2,016	5,376
H/C HRS ON:	3,285	8,760
CLG HRS SAVED:	2,100	- 
HTG HRS SAVED:	3,360	 F
C/H HRS SAVED:	5,475	

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
нолон:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	,,,,
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95 PREPARED BY: AJN/CWW

BLDG: 5800 BUILDING NAME: YOUTH CTR

**ENERGY CALCULATION SUMMARY** 

System Type: 26
System Name: Pump
System Number: HWP-1

LOCATION: FT. RILEY, KS

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	5,141.66	0.00
0.00	466.73	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00.
0.00	5,608.39	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		3.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         5,141.66           0.00         466.73           0.00         0.00           0.00         0.00           0.00         0.00           0.00         5,608.39           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS FUNCTO NO.		DO -	AO	DI	RY AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0		0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

CRIRCI #. DAGA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	5800	BUILDING NAME:	YOUTH CTR
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Building UA: 2,572 CONDITIONED SQFT: 21,560

#### SYTEM INFORMATION

System Type: 26
System Name: Pump
System Number: HWP-2

#### TYPICAL BUILDING INFORMATION

atagory Number: Construction:	Use:	Occupancy HRS:	Occupancy Days:
16 BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	5	5	5	8	8
REQ STOP:	0	22	19	19	19	2	19

#### **INPUTS** Motor HP: 2.00 HP Effic: 0.78 Load Factor: 0.80 CFM-HTG: 0 CFM-CLG: 0 %OA: 0% %Area: 0% CHILLER CAP (TONS): 0 KW-TON: 0.00 **BLR CAP INPUT (BTUH):** 0 BLR CAP OUTPUT (BTUH): 0

		PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,260	3,360
HTG HRS ON:	2,016	5,376
H/C HRS ON:	3,285	8,760
CLG HRS SAVED:	2,100	
HTG HRS SAVED:	3,360	
C/H HRS SAVED:	5,475	

HOAUHC:	20.0
	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 5800 BUILDING NAME: YOUTH CTR

ENERGY CALCULATION SUMMARY

 System Type:
 26

 System Name:
 Pump

 System Number:
 HWP-2

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	5,141.66	0.00
Opt ST/SP	0.00	466.73	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	5,608.39	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.00	5,608.39	0.00

	TYPICAL SYSTEM	N POINT A	ND COS	T SUMM/	\RY	
UMCS						COST
FUNCTI NO.	N UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:					\$386.00

## BUILDING 6620 COMMUNICATION ACT CENTER

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95 PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG: 6620	BUILDING NAM	E: COMMUN ACT CTR	
Building UA:	4,433	CONDITIONED SQFT:	31,740
YTEM INFORMATION	ST C Production of the state of		
System Type: 1	0		
System Name:	Multizone air handling unit	,	
System Number:	NHU-1		

TYPICAL BUILD	ING INFORMATIO	N AND LONG		
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	1 BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0.	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,910
CFM-CLG:	12,910
%OA:	10%
%Area:	32%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 3,360 900 HTG HRS ON: 1,440 5,376 8,760 H/C HRS ON: 2,346 CLG HRS SAVED: 2,460 HTG HRS SAVED: 3,936 C/H HRS SAVED: 6,414

ONSTANTS:	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	(
COAUC:	(
HOAOHC:	17.3
НОАОН:	27.9
COAOHC:	0.00088
COAOC:	0.00234
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00020
ECHC:	0.0000784
NSUCHC:	0.00022
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.00024
NSC:	3050
DDCH:	3190
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 6620 BUILDING NAME: COMMUN ACT CTR

**ENERGY CALCULATION SUMMARY** 

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u> ±	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	34,545.30	174.71	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	18,298.62	43.27	
Sub Total	10.99	54,486.74	217.97	
Economizer	0.00	2,374.92	0.00	
Ventilation/Recirculation	0.00	0.00	8.31	
DDC Control	0.00	2,783.87	45.25	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.0
and Safety Alarms TOTAL	10.99	59,645.54	271.53	

	TYPICAL SYSTEM POINT AND COST SUMMARY							
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST		
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00		
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00		
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00		
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00		
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00		
	TOTAL:	1	8	1	11	\$4,509.00		

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	6620	BUILDING NAME:	COMMUN ACT CTR	
	Building UA:	4,433	CONDITIONED SQFT:	31,740

# SYTEM INFORMATION System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	1 BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	. 0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

7.50	Motor HP:
0.83	HP Effic:
0.80	Load Factor:
9,600	CFM-HTG:
9,600	CFM-CLG:
30%	%OA:
23%	%Агеа:
0	CHILLER CAP (TONS):
0.00	KW-TON:
0	BLR CAP INPUT (BTUH):
0	BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	900	3,360
HTG HRS ON	1,440	5,376
H/C HRS ON	2,346	8,760
CLG HRS SAVED	2,460	)
HTG HRS SAVED	: 3,936	5
C/H HRS SAVED	6,414	ļ

<u>CONSTANTS</u>	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
нолон:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 6620 BUILDING NAME: COMMUN ACT CTR

ENERGY CALCULATION SUMMARY

System Type: 15

System Name:

Small Single Zone air handling unit

System Number: AHU-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	34,545.30	389.74	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	13,607.03	31.10	
Sub Total	10.99	49,795.15	420.84	
Economizer	0.00	1,766.02	0.00	
Ventilation/Recirculation	0.00	0.00	18.53	
DDC Control	0.00	2,070.11	32.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	6620	BUILDING NAME:	COMMUN ACT CTR	
[	Building UA:	4,433	CONDITIONED SQFT:	31,740

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: AHU-3

## TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	21 BRICK AND CMU	TRAINING	0700-2100	M-F

32 Weeks of Winter: 20 Weeks of Summer:

## SYSTEM OPERATING SCHEDULE

A STOREGOE DE CONTRACTOR DE LA CONTRACTOR DE	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	10,500
CFM-CLG:	0
%OA:	100%
%Area:	14%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

## HOURS CALCULATIONS

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED	2,460	<u> </u>
HTG HRS SAVED	3,936	5
C/H HRS SAVED	6,414	-

## <u>CONSTANTS</u>

HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 6620

BUILDING NAME: COMMUN ACT CTR

#### ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: AHU-3

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtú/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	14,393.41	1,405.15	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	18.93	
Sub Total	0.00	15,508.75	1,424.08	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	19.80	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.04
TOTAL	0.00	15,508.75	1,443.88	3.0

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	6620	BUILDING NAME:	COMMUN ACT CTR	
	Building UA:	4,433	CONDITIONED SQFT:	31,740

#### SYTEM INFORMATION ....

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	1 BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

## SYSTEM OPERATING SCHEDULE

St. Miller Coll. Miller 1884 Annie Amerikaansk 1865	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	5.00
MOTOL UP:	
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	8,800
CFM-CLG:	8,800
%OA:	34%
%Area:	23%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	C

## HOURS CALCULATIONS

		HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	
C/H HRS SAVED	6,414	

<u>ONSTANTS</u>	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	
COAUC:	(
HOAOHC:	17.3
НОАОН:	27.9
COAOHC:	0.00088
COAOC:	0.00234
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00020
ECHC:	0.0000784
NSUCHC:	0.00022
NSUCC:	0.00058
DDCCHC:	0.000091
DDCCC:	0.00024
NSC:	3050
DDCH:	3190
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 6620 BUILDING NAME: COMMUN ACT CTR

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

FUNCTION -	kW/yr	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	23,453.55	404.90	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	12,473.11	31.10	
Sub Total	7.46	37,042.01	435.99	
Economizer	0.00	1,618.85	0.00	
/entilation/Recirculation	0.00	0.00	19.26	
DDC Control	0.00	1,897.60	32.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	7.46	40,558.46	487.77	3.0

	TYPICAL SYSTEM	POINT A	(ND COS	T SUMM/	<b>ARY</b>	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	6620	BUIL	DING NAME: C	OMMUN ACT CTR	

Building UA: 4,433

CONDITIONED SQFT:

31,740

#### SYTEMINEORMATION

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	21 BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
<b>REQ START:</b>	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>NPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	5,736,000
BLR CAP OUTPUT (BTUH):	4,520,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	1
C/H HRS SAVED:	6,414	1

<u>CONSTANTS</u>	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
нолон:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO**: 1406-001 **DATE**: 09-Dec-95

LOCATION: FT. RILEY, KS PREPARED BY: AJN/CWW

BLDG: 6620 BUILDING NAME: COMMUN ACT CTR

**ENERGY CALCULATION SUMMARY** 

System Type:

System Name: Small steam boiler

System Number: BLR-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00,
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring,			4.0
Maintenance, Run Time, and Safety Alarms		:	
TOTAL	- 0.00	0.00	0.00 4.00

	TYPICAL SYST	EM POINT AN	ID COST	SUMMA	RY	
UMCS	A CONTRACTOR OF THE CONTRACTOR	DO	AO	DI	ΑI	COST
NO.		POINTS	POINTS	POINTS	POINTS	
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TOTAL		0	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 **DATE**: 16-Sep-95

PREPARED BY: AJN/CWW LOCATION: FT. RILEY, KS

## **ENERGY CALCULATION PARAMETERS**

BLDG: 6620	BUILDING NAME:	COMMUN ACT CTR	
Building UA:	4,433	CONDITIONED SQFT:	31,740
YTEM NEORMATION			
System Type: 6			
0 1 N - 0 - 1			

System Type: 6	
 System Name: Small air cooled chiller	
\$ System Number: CH-1	

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

TING S	CHEDUL	<b>E</b>					
SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:	
0	0	0	0	0	0	0	
24	24	24	24	24	24	24	
0	7	7	7	7	7	0	
0	16	16	16	16	16	0	
	TING S	TING SCHEDUL	TING SCHEDULE	TING SCHEDULE	TING SCHEDULE	TING SCHEDULE	TING SCHEDULE

Motor HP:	7.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	130
KW-TON:	1.10
BLR CAP INPUT (BTUH):	(
BLR CAP OUTPUT (BTUH):	(

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	900	3,360
HTG HRS ON	1,440	5,376
H/C HRS ON	2,346	8,760
CLG HRS SAVED	2,460	)
HTG HRS SAVED	3,936	5
C/H HRS SAVED	6,414	Ī

24	HOALING
21.	HOAUHC:
3	HOAUH:
	COAUHC:
	COAUC:
17.	HOAOHC:
27.	HOAOH:
0.00088	COAOHC:
0.0023	COAOC:
0.1	DC DUTY:
0.1	DC DEMAND:
0.00020	ECC:
0.000078	ECHC:
0.00022	NSUCHC:
0.00058	NSUCC:
0.000091	DDCCHC:
0.00024	DDCCC:
3050	NSC:
3190	DDCH:
30	OPT:
17.	CHWR:
	CNWR:
5.6	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 6620 BUILDING NAME: COMMUN ACT CTR

ENERGY CALCULATION SUMMARY

System Type: 6
System Name: Small air cooled chiller
System Number: CH-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	14,970.71	0.00
Opt ST/SP	0.00	1,856.13	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	4.66	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	4.66	16,826.84	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	2,275.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	109.40	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.00
TOTAL	114.05	19,101.84	0.00 4.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	6620	BUILDING NAME:	COMMUN ACT CTR	
	Building UA:	4,433	CONDITIONED SQFT:	31,740

#### SYTEM INFORMATION ...

System Type: 5

System Name: Steam to hot water converter

System Number: CV-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	1 BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.70
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	4,520,000
BLR CAP OUTPUT (BTUH):	4,520,000

# HOURS CALCULATIONS

	REQUIRED	PRESENT
,	HR/YR	HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED	2,460	- 
HTG HRS SAVED	3,936	= i
C/H HRS SAVED:	6,414	~ ·
·		•

	<u>ONSTANTS</u>
21.1	HOAUHC:
34	HOAUH:
(	COAUHC:
(	COAUC:
17.3	HOAOHC:
27.9	нолон:
0.000885	COAOHC:
0.00234	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000207	ECC:
0.0000784	ECHC:
0.000221	NSUCHC:
0.000584	NSUCC:
0.0000919	DDCCHC:
0.000243	DDCCC:
30500	NSC:
31900	DDCH:
305	OPT:
17.5	CHWR:
	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 6620 BUILDING NAME: COMMUN ACT CTR

ENERGY CALCULATION SUMMARY

System Type: 5

System Name: Steam to hot water converter

System Number: CV-1

FUNCTION :	<u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	6,711.44	0.00	SS. S. S. S. S. S. S. S. S. S. S. S. S.
Opt ST/SP	0.00	520.07	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	7,231.51	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	25.63	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	7,231.51	25.63	3.00

NCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

System Number: CWP-1

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	6620	BUILDING NAME:	COMMUN ACT CTR	
	Building UA:	4,433	CONDITIONED SQFT:	31,740

System Name: Pump	ì
System Type: 26	
SYTEM INFORMATION	

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks o	f Winter:	32		
Weeks of S		20		

SYSTEM OPERA	TING S	CHEDUL	E				
Kirk Commission Commission	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
DEO STOD		16	16	16	16	16	0

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	C
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	(
KW-TON:	0.00
BLR CAP INPUT (BTUH):	(
BLR CAP OUTPUT (BTUH):	(

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	5
C/H HRS SAVED:	6,414	_  -

CONSTANTS	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
ноаон:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 6620 BUILDING NAME: COMMUN ACT CTR

ENERGY CALCULATION SUMMARY

 System Type:
 26

 System Name:
 Pump

 System Number:
 CWP-1

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	13,250.25	0.00
Opt ST/SP	0.00	1,642.82	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	4.12	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	4.12	14,893.07	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	4.12	14,893.07	0.00 3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO: POINTS	ÄÖ	T SUMMA  DI POINTS	ARY AI POINTS	cost
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	Ó	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #:** DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	6620	BUILDING NAME:	COMMUN ACT CTR	
	Building UA:	4,433	CONDITIONED SQFT:	31,

**Building UA:** 

31,740

#### SYTEM INFORMATION

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	1 BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	. 0	7	. 7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>NPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	C

#### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED	2,460	
HTG HRS SAVED	3,936	
C/H HRS SAVED	6,414	

<u>CONSTANTS</u>	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
нолон:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 6620 BUILDING NAME: COMMUN ACT CTR

ENERGY CALCULATION SUMMARY

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

FUNCTION	<u>kWiyr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	1,779.55	0.00
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	1,917.45	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	1,917.45	0.00 , 3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	ND COST AO POINTS	DI.	RY AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
	TOTAL:	<b>1</b>	0	1	1	\$570.00

## BUILDING 6910 EXC SP ST FACILITY

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	6910	BUILDING NAME:	EXC SP ST FAC	

**Building UA:** 789

CONDITIONED SQFT:

2,525

## SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	17 BRICK AND CMU	RETAIL SHOP	0800-2200	M-F; SAT-SUN

## SYSTEM OPERATING SCHEDULE

Weeks of Summer:

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0.
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	11	11	11	11	11	10
REQ STOP:	0	22	22	22	22	22	22

20

## <u>INPUTS</u>

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,360
CFM-CLG:	1,360
%OA:	15%
%Area:	50%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	1,340	3,360
HTG HRS ON:	2,144	5,376
H/C HRS ON:	3,494	8,760
CLG HRS SAVED:	2,020	
HTG HRS SAVED:	3,232	
C/H HRS SAVED:	5,266	

#### <u>CONSTANTS</u>

	%0%d855.20
HOAUHC:	17.4
HOAUH:	28
COAUHC:	0.000233
COAUC:	0.000615
HOAOHC:	36.7
НОАОН:	59.1
COAOHC:	0.00124
COAOC:	0.00328
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000795
ECHC:	0.0003
NSUCHC:	0.000455
NSUCC:	0.0012
DDCCHC:	0.000248
DDCCC:	0.000657
NSC:	397000
DDCH:	207000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 6910 BUILDING NAME: EXC SP ST FAC

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

2,631.39 137.90 0.00 0.00 0.3,258.87 0.6,028.15 0.00 0.00	0.00 0.00 0.00 156.62 175.31 0.00	
0.00 0.00 0.3,258.87 0.6,028.15 0.00	0.00 0.00 156.62 175.31 0.00	
0.00° 0.3,258.87 0.6,028.15 0.000	0.00 156.62 175.31 0.00	
3,258.87 6,028.15 0 0.00 0 0.00	156.62 175.31 0.00	
0 6,028.15 0 0.00 0 0.00	<b>175.31</b>	
0.00	0.00	
0.00		
	0.00	
4 470 34		
1,178.31	81.66	
0.00	0.00	
0.00	0.00	
0.00	0.00	
0.00	0.00	
		3.00
)	0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	6910	BUILDING NAME:	EXC SP ST FAC	
	Building UA:	789	CONDITIONED SQFT:	2,525

## SYTEM INFORMATION

System Type:	15
	Small Single Zone air handling unit
System Number:	AHU-2

TYPICAL BUILDI	NG INFORMATIO	у.		
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	BRICK AND CMU	RETAIL SHOP	0800-2200	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	11	11	11	11	11	10
REQ STOP:	0	22	22	22	22	22	22

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,360
CFM-CLG:	1,360
%OA:	15%
%Area:	50%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,340	3,360
HTG HRS ON:	2,144	5,376
H/C HRS ON:	3,494	8,760
CLG HRS SAVED:	2,020	-
HTG HRS SAVED:	3,232	-
C/H HRS SAVED:	5,266	*

<u>CONSTANTS</u>	
HOAUHC:	17.4
HOAUH:	28
COAUHC:	0.000233
COAUC:	0.000615
HOAOHC:	36.7
HOAOH:	59.1
COAOHC:	0.00124
COAOC:	0.00328
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000795
ECHC:	0.0003
NSUCHC:	0.000455
NSUCC:	0.0012
DDCCHC:	0.000248
DDCCC:	0.000657
NSC:	397000
DDCH:	207000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 6910 BUILDING NAME: EXC SP ST FAC

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	2,631.39	18.69
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	3,258.87	156.62
Sub Total	0.00	6,028.15	175.31
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	1,178.31	81.66
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.
TOTAL	0.00	7,206.46	256.97

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	ARY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	6910	BUILDING NAME:	EXC SP ST FAC	
	Building UA:	789	CONDITIONED SQFT:	2,525

## SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	RETAIL SHOP	0800-2200	M-F; SAT-SUN
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	11	11	11	11	11	10
REQ STOP:	0	22	22	22	22	22	22

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

## HOURS CALCULATIONS

	PRESENT HR/YR
1,340	3,360
2,144	5,376
3,494	8,760
: 2,020	1
: 3,232	
5,266	- i

<u>CONSTANTS</u>	T. C. C.
HOAUHC:	17.4
HOAUH:	28
COAUHC:	0.000233
COAUC:	0.000615
HOAOHC:	36.7
НОАОН:	59.1
COAOHC:	0.00124
COAOC:	0.00328
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000795
ECHC:	0.0003
NSUCHC:	0.000455
NSUCC:	0.0012
DDCCHC:	0.000248
DDCCC:	0.000657
NSC:	397000
DDCH:	207000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 6910 BUILDING NAME: EXC SP ST FAC

ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

FUNCTION	<u>kW/yr</u> .	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	87.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	4.21	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	4.21	87.50	0.00

UMCS FUNCTI NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO	ND COS AO POINTS	T SUMM/ DI POINTS	ARY AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0		0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

EMC NO: 1406-001

# **ENERGY CALCULATION PARAMETERS**

BLDG: 6910 BUIL	DING NAME: EXC SP ST FAC
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Building UA:	789	CONDITIONED SQFT:	2 525
bullding on.	103	CONDITIONED SQF1.	2,323.

#### SYTEM INFORMATION .....

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-2

1072 OALBUILD	ING INFORMATIO	N	ere jag	and the second second
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	7 BRICK AND CMU	RETAIL SHOP	0800-2200	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	lummer:	20		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	11	11	11	11	11	10
REQ STOP:	0	22	22	22	22	22	22

INPUTS	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	5
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,340	3,360
HTG HRS ON:	2,144	5,376
H/C HRS ON:	3,494	8,760
CLG HRS SAVED:	2,020	-
HTG HRS SAVED	3,232	-
C/H HRS SAVED:	5,266	-

	SASCANS, INC. PROCESSES
HOAUHC:	17
HOAUH:	2
COAUHC:	0.00023
COAUC:	0.0006
НОАОНС:	36
HOAOH:	59
COAOHC:	0.0012
COAOC:	0.0032
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00079
ECHC:	0.000
NSUCHC:	0.00045
NSUCC:	0.00
DDCCHC:	0.00024
DDCCC:	0.00065
NSC:	39700
DDCH:	20700
OPT:	30
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 6910

BUILDING NAME: EXC SP ST FAC

ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	87.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	4.21	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	AV		,	3.00
TOTAL	4.21	87.50	0.00	3.00

UMCS FUNCTI NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	ND COS AO POINTS	DI	RY AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

# **BUILDING 6914 EXC MAIN RETL**

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**DATE:** 16-Sep-95

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	6914	BUILDING NAME	E EXC MAIN RETL	
1	Building UA:	18,359	CONDITIONED SQFT:	63,930

SYTEM INFORMATION	
System Type: 15	
System Name: Small Single Zone	air handling unit

System Number: AHU-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1	7 BRICK AND CMU		RETAIL SHOP	0800-2200	M-F; SAT-SUN
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

#### SYSTEM OPERATING SCHEDULE MON: SUN: TUE: THUR: FRI: SAT: WED: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24

24 **REQ START:** 10 9 9 9 9 9 9 REQ STOP: 19 21 21 21 21 21 21

Motor HP:	20.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	28,100
CFM-CLG:	28,100
%OA:	57%
%Area:	51%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	4 8,760
CLG HRS SAVED:	1,740	ō
HTG HRS SAVED:	2,784	4
C/H HRS SAVED:	4,536	5

HOAUHC:	17.4
HOAUH:	28
COAUHC:	0.000233
COAUC:	0.000615
HOAOHC:	36.7
HOAOH:	59.1
COAOHC:	0.00124
COAOC:	0.00328
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000795
ECHC:	0.0003
NSUCHC:	0.000455
NSUCC:	0.0012
DDCCHC:	0.000248
DDCCC:	0.000657
NSC:	397000
DDCH:	207000
OPT:	30!
CHWR:	17.5
CNWR:	(
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: AJN/AMS/CWW

BLDG: 6914 BUILDING NAME: EXC MAIN RETL

**ENERGY CALCULATION SUMMARY** 

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	78,390.40	1,264.28	
Opt ST/SP	0.00	4,132.21	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	58,000.51	3,717.15	
Sub Total	0.00	140,523.12	4,981.43	
Economizer	0.00	35,604.71	0.00	
Ventilation/Recirculation	0.00	1,138.25	85.00	
DDC Control	0.00	29,433.22	1,938.16	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				3.
Maintenance, Run Time, and Safety Alarms				3.

MCS NCTN NO:	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/AMS/CWW

LOCATION: FT. RILEY, KS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	6914	BUILDI	NG NAME: EX	C MAIN RETL	
	Building UA:	18,359		CONDITIONED SQFT:	63,930

# SYTEM INFORMATION

<u> </u>	100
System Type: 15	
System Name: Small Single Zone air handling unit	
System Number: AHU-2	1

Catagory Number:	Construction:	Use:		Occupancy HRS:	Occupancy Days:
	17 BRICK AND CMU	RETAIL	SHOP	0800-2200	M-F; SAT-SUN
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	3,500
CFM-CLG:	3,500
%OA:	17%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	1,620	3,360
HTG HRS ON	2,592	5,376
H/C HRS ON	4,224	8,760
CLG HRS SAVED	1,740	_ )
HTG HRS SAVED	2,784	<b>‡</b>
C/H HRS SAVED	4,536	3

<u>CONSTANTS</u>	
HOAUHC:	17.4
HOAUH:	28
COAUHC:	0.000233
COAUC:	0.000615
HOAOHC:	36.7
HOAOH:	59.1
COAOHC:	0.00124
COAOC:	0.00328
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000795
ECHC:	0.0003
NSUCHC:	0.000455
NSUCC:	0.0012
DDCCHC:	0.000248
DDCCC:	0.000657
NSC:	397000
DDCH:	207000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/AMS/CWW

BLDG: 6914 BUILDING NAME: EXC MAIN RETL

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

FUNCTION .	kW/yr	kWh/yr	<u>MBtu/yr</u>	MH/yr
Schedule ST/SP	0.00	7,570.81	46.97	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	7,224.26	437.31	
Sub Total	0.00	15,261.80	484.28	
Economizer	0.00	4,434.75	0.00	_
Ventilation/Recirculation	0.00	42.28	3.16	
DDC Control	0.00	3,666.06	228.02	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:		3.0
TOTAL	0.00	23,404.89	715.45	. 3.0

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	9	3	0.75	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	6914	BUILDING NAME:	EXC MAIN RETL	
	Building UA:	18,359	CONDITIONED SQFT:	63,930

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: AHU-3

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 17 BRICK AND CMU RETAIL SHOP 0800-2200 M-F; SAT-SUN Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

<u>Inputs</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,380
CFM-CLG:	0
%OA:	25%
%Агеа:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT CLG HRS ON: 1,620 3,360 5,376 HTG HRS ON: 2,592 H/C HRS ON: 4,224 8,760 CLG HRS SAVED: 1,740 2,784 HTG HRS SAVED: C/H HRS SAVED: 4,536

<u>CONSTANTS</u>	
HOAUHC:	17.4
HOAUH:	28
COAUHC:	0.000233
COAUC:	0.000615
HOAOHC:	36.7
нолон:	59.1
COAOHC:	0.00124
COAOC:	0.00328
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000795
ECHC:	0.0003
NSUCHC:	0.000455
NSUCC:	0.0012
DDCCHC:	0.000248
DDCCC:	0.000657
NSC:	397000
DDCH:	207000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: AJN/AMS/CWW

BLDG: 6914 BUILDING NAME: EXC MAIN RETL

# ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: AHU-3

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yt
Schedule ST/SP	0.00	10,180.71	143.82	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	947.51	
Sub Total	0.00	11,296.05	1,091.33	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	15.76	
DDC Control	0.00	0.00	494.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/CWW

EMC NO: 1406-001

# **ENERGY CALCULATION PARAMETERS**

BLDG:	6914	BUILDING NAME:	EXC MAIN RETL	
	Building UA:	18,359	CONDITIONED SQFT:	63,930

#### SYTEM INFORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-4

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	17 BRICK AND CMU	RETAIL SHOP	0800-2200	M-F; SAT-SUN

# SYSTEM OPERATING SCHEDULE

Weeks of Summer:

33,000	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

20

<u>INPUTS</u>	
Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	9,620
CFM-CLG:	9,620
%OA:	10%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760
CLG HRS SAVED:	1,740	
HTG HRS SAVED	2,784	- -
C/H HRS SAVED	4,536	5

#### **CONSTANTS** 17.4 HOAUHC: 28 **HOAUH:** 0.000233 COAUHC: COAUC: 0.000615 36.7 HOAOHC: 59.1 HOAOH: 0.00124 COAOHC: 0.00328 COAOC: 0.17 DC DUTY: DC DEMAND: 0.17 ECC: 0.000795 0.0003 ECHC: 0.000455 NSUCHC: 0.0012 NSUCC: 0.000248 DDCCHC: 0.000657 DDCCC: NSC: 397000 207000 DDCH: 305 OPT: CHWR: 17.5 0 CNWR: OAR: 5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/AMS/CWW

BLDG: 6914 BUILDING NAME: EXC MAIN RETL

**ENERGY CALCULATION SUMMARY** 

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-4

MH/yr kWh/yr MBtu/yr **FUNCTION** kW/vr 75.93 Schedule ST/SP 0.00 32,570.91 Opt ST/SP 0.00 2,121.49 0.00 0.00 0.00 0.00 **Duty Cycle Demand Limit** 0.00 0.00 0.00 1,311.93 0.00 19,856.40 Night Setback 1,387.87 0.00 54,548.80 **Sub Total** Economizer 0.00 12,189.23 0.00 0.00 5.11 Ventilation/Recirculation 68.36 0.00 10,076.43 684.06 **DDC Control** 0.00 0.00 0.00 **HW OA Reset** 0.00 0.00 0.00 **Chilled Water Reset** 0.00 0.00 0.00 Condenser Water Reset 0.00 0.00 0.00 **Chiller Demand Limit** 5.00 Remote Monitoring, Maintenance, Run Time, and Safety Alarms

TOTAL 0.00 76,882.82 2,077.03 5.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	\RY	
UMCS FUNCTN NO:	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:		8	1	11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

#### PREPARED BY: AJN/AMS/CWW

<b>ENERGY</b>	CALCUI	ATION	PARA	METERS

BLDG:	6914	BUILDING NAME:	EXC MAIN RETL	
	Building UA:	18,359	CONDITIONED SQFT:	63,930

# SYTEM INFORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-5

Catagory Number:	Construction:	***************************************	Use:	Occupancy HRS:	Occupancy Days:
1	7 BRICK AND CMU		RETAIL SHOP	0800-2200	M-F; SAT-SUN
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

<u>INPUTS</u>	
Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,790
CFM-CLG:	6,790
%OA:	10%
%Агеа:	12%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	1,620	3,360
HTG HRS ON	2,592	5,376
H/C HRS ON	4,224	8,760
CLG HRS SAVED	1,740	- !
HTG HRS SAVED	2,784	-
C/H HRS SAVED	4,536	•

#### <u>CONSTANTS</u>

HOAUHC:	17.4
HOAUH:	28
COAUHC:	0.000233
COAUC:	0.000615
HOAOHC:	36.7
НОАОН:	59.1
COAOHC:	0.00124
COAOC:	0.00328
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000795
ECHC:	0.0003
NSUCHC:	0.000455
NSUCC:	0.0012
DDCCHC:	0.000248
DDCCC:	0.000657
NSC:	397000
DDCH:	207000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/CWW

BUILDING NAME: EXC MAIN RETL BLDG: 6914

# ENERGY CALCULATION SUMMARY

System Type: Multizone air handling unit System Name: AHU-5 System Number:

FUNCTION	kW/vr	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	25,152.18	53.60	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	14,015.07	874.62	
Sub Total	0.00	40,810.06	928.22	
Economizer	0.00	8,603.41	0.00	
Ventilation/Recirculation	0.00	48.25	3.60	
DDC Control	0.00	7,112.16	456.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		56,573,89	1,387.86	5.0 `

	TYPICAL SYSTEM POINT AND COST SUMMARY					
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	8	1	11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	6914	BUILDING NAME:	EXC MAIN RETL

**Building UA:** 18,359 CONDITIONED SQFT:

63,930

SYTEM INFORMATION:

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	17 BRICK AND CMU	RETAIL SHOP	0800-2200	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

Motor HP:	5.00
***************************************	
HP Effic:	0.73
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,000,000
BLR CAP OUTPUT (BTUH):	1,600,000

## **HOURS CALCULATIONS**

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760
CLG HRS SAVED:	1,740	-
HTG HRS SAVED:	2,784	
C/H HRS SAVED:	4,536	7

<u>CONSTANTS</u>	
HOAUHC:	17.4
HOAUH:	28
COAUHC:	0.000233
COAUC:	0.000615
HOAOHC:	36.7
НОАОН:	59.1
COAOHC:	0.00124
COAOC:	0.00328
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000795
ECHC:	0.0003
NSUCHC:	0.000455
NSUCC:	0.0012
DDCCHC:	0.000248
DDCCC:	0.000657
NSC:	397000
DDCH:	207000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67
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PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/CWW

BUILDING NAME: EXC MAIN RETL BLDG: 6914 **ENERGY CALCULATION SUMMARY** System Type:

Small hot water boiler System Name: BLR-1 System Number:

kW/vr	kWh/yr	MBtu/yr MH/yr
0.00	11,411.34	0.00
0.00	1,250.16	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	12,661.51	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	11.34
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		4.
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         11,411.34           0.00         1,250.16           0.00         0.00           0.00         0.00           0.00         0.00           0.00         12,661.51           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

TYPICAL SYSTEM POINT AND COST SUMMARY						
UMCS FUNCTN NO.	UMCS APPLICATION	DO · POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2 2	3	<b>\$</b> 1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/AMS/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	6914	BUILDING	G NAME: EXC MAIN RETL	
	Building UA:	18,359	CONDITIONED SQFT:	63,930

# SYTEM INFORMATION

System Type: 7
System Name: Large air cooled chiller
System Number: CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	7 BRICK AND CMU	RETAIL SHOP	0800-2200	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

<u>INPUTS</u>	
Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	127
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760
CLG HRS SAVED	1,740	
HTG HRS SAVED	2,784	Ī
C/H HRS SAVED:	4,536	5

HOAUHC:	17.4
HOAUH:	28
COAUHC:	0.000233
COAUC:	0.000615
НОАОНС:	36.7
НОАОН:	59.1
COAOHC:	0.00124
COAOC:	0.00328
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000795
ECHC:	0.0003
NSUCHC:	0.000455
NSUCC:	0.0012
DDCCHC:	0.000248
DDCCC:	0.000657
NSC:	397000
DDCH:	207000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/AMS/CWW

BLDG: 6914 BUILDING NAME: EXC MAIN RETL

ENERGY CALCULATION SUMMARY

System Type: 7

System Name: Large air cooled chiller

System Number: CH-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,372.13	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	4.12	11,014.95	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	2,222.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	106.87	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				6.00
TOTAL	110.99	13,237.45	0.00	6.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	O	\$386.00
12	Chilled water reset - Large Air Cooled Chiller	0	0	0	4	\$1,133.00
16	Alarms - Chiller	0	0	2	0	\$281.00
43	Chiller demand limiting - Large Air Cooled Chiller	5	0	0	0	\$530.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/AMS/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	6914	BUILDING NAME:	EXC MAIN RETL	
	Building UA:	18,359	CONDITIONED SQFT:	63,930

#### <u>Sytem information</u> \*\*\*.

System Type: 7 System Name: Large air cooled chiller System Number: CH-2

# TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 17 BRICK AND CMU **RETAIL SHOP** 0800-2200 M-F; SAT-SUN Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

0

#### Motor HP: 7.50 **HP Effic:** 0.83 Load Factor: 0.80 CFM-HTG: 0 0 CFM-CLG: %OA: 0% %Area: 0% **CHILLER CAP (TONS):** 127 KW-TON: 1.10 **BLR CAP INPUT (BTUH):** 0

#### HOURS CALCULATIONS

BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	1,620	3,360
HTG HRS ON	2,592	5,376
H/C HRS ON:	4,224	8,760
CLG HRS SAVED	1,740	
HTG HRS SAVED	2,784	-
C/H HRS SAVED	4,536	<del>.</del>

	<u>CONSTANTS</u>
17.4	HOAUHC:
28	HOAUH:
0.000233	COAUHC:
0.000615	COAUC:
36.7	HOAOHC:
59.1	нолон:
0.00124	COAOHC:
0.00328	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000795	ECC:
0.0003	ECHC:
0.000455	NSUCHC:
0.0012	NSUCC:
0.000248	DDCCHC:
0.000657	DDCCC:
397000	NSC:
207000	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

System Number:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

CH-2

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: AJN/AMS/CWW

BLDG: 6914

BUILDING NAME: EXC MAIN RETL

ENERGY CALCULATION SUMMARY

System Type: 7

System Name: Large air cooled chiller

<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
0.00	9,372.13	0.00
0.00	1,642.82	0.00
0.00	0.00	0.00
4.12	0.00	0.00
0.00	0.00	0.00
4.12	11,014.95	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	2,222.50	0.00
0.00	0.00	0.00
106.87	0.00	0.00
		6.0 6.0
	0.00 0.00 0.00 4.12 0.00 4.12 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         9,372.13           0.00         1,642.82           0.00         0.00           4.12         0.00           0.00         0.00           4.12         11,014.95           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

JMCS JNCTN NO:	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	O	1	0	\$386.00
12	Chilled water reset - Large Air Cooled Chiller	0	0	0	4	\$1,133.00
16	Alarms - Chiller	0	0	2	0	\$281.00
43	Chiller demand limiting - Large Air Cooled Chiller	5	0	0	0	\$530.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	6914	F	BUILDING NAME: EXC MAIN RETL				
	Building UA:	18,3	359	CONDITIONE	D SQFT:	63,930	
YTEN	INFORMATION						
	System Type: 2	6					
	System Name: F	'ump			!		

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1	7 BRICK AND CMU		RETAIL SHOP	0800-2200	M-F; SAT-SUN
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	10	9	9	9	9	9	9
REQ STOP:	19	21	21	21	21	21	21

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,620	3,360
HTG HRS ON:	2,592	5,376
H/C HRS ON:	4,224	8,760
CLG HRS SAVED:	1,740	- !
HTG HRS SAVED:	2,784	-
C/H HRS SAVED:	4,536	

	CONSTANTS
17.4	HOAUHC:
28	HOAUH:
0.000233	COAUHC:
0.000615	COAUC:
36.7	HOAOHC:
59.1	НОАОН:
0.00124	COAOHC:
0.00328	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000795	ECC:
0.0003	ECHC:
0.000455	NSUCHC:
0.0012	NSUCC:
0.000248	DDCCHC:
0.000657	DDCCC:
397000	NSC:
207000	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/CWW

BLDG: 6914	BUILDING	NAME:	EXC MAIN RETL
	<b>ENERGY CAL</b>	CULAT	ION SUMMARY
System Type:	26	AND THE PERSON NAMED IN COLUMN TWO IS NOT	
System Name:	Pump		
System Number:	HWP-1		

kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	10,180.71	0.00
0.00	1,115.34	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	11,296.05	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		3.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         10,180.71           0.00         1,115.34           0.00         0.00           0.00         0.00           0.00         0.00           0.00         11,296.05           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS FUNCTN	TYPICAL SYSTEM  UMCS APPLICATION	DO :	AO	DI	AI	COST
NO.		POINTS	POINTS	POINTS	POINTS	
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	O	1	0	\$386.00
	TOTAL:		Ó		0	\$386.00

# BUILDING 6918 SKILL DEVELOPMENT CENTER

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	6918	BUILDING NAME:	SKILL DEV CTR	
	Building UA:	3,864	CONDITIONED SQFT:	11,507
SYTEM	INFORMATION			

MUNICIONALIUM	
System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	. 0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	21	17	0

M-4ID.	2.00
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,000
CFM-CLG:	4,000
%OA:	20%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR 880 3,360 CLG HRS ON: 5,376 1,408 HTG HRS ON: 8,760 H/C HRS ON: 2,294 CLG HRS SAVED: 2,480 3,968 HTG HRS SAVED: C/H HRS SAVED: 6,466

	<u>ONSTANTS</u>
21.	HOAUHC:
3	HOAUH:
	COAUHC:
	COAUC:
17.	HOAOHC:
27.	HOAOH:
0.00088	COAOHC:
0.0023	COAOC:
0.1	DC DUTY:
0.1	DC DEMAND:
0.00020	ECC:
0.000078	ECHC:
0.00022	NSUCHC:
0.00058	NSUCC:
0.000091	DDCCHC:
0.00024	DDCCC:
3050	NSC:
3190	DDCH:
30	OPT:
17	CHWR:
	CNWR:
5.6	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 6918 BUILDING NAME: SKILL DEV CTR
ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtulyr MHlyr
Schedule ST/SP	0.00	9,894.20	109.14
Opt ST/SP	0.00	466.73	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	5,715.69	20.03
Sub Total	0.00	16,076.62	129.18
Economizer	0.00	719.49	0.00
Ventilation/Recirculation	0.00	0.00	5.15
DDC Control	0.00	843.38	20.95
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL State of the state of the	0.00	17,639.49	155.28 3.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #:** DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

# PREPARED BY: AJN/CWW **ENERGY CALCULATION PARAMETERS**

BLDG: 6918 BUILDING NAME: SKILL DEV CTR

**Building UA:** 3,864 CONDITIONED SQFT:

11,507

SYTEM INFORMATION --

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

TYPICAL BUILD	ING INFORMATION	1.4.		
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	21	17	0

<u>INPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,400
CFM-CLG:	1,400
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### PRESENT REQUIRED HR/YR HR/YR CLG HRS ON: 880 3,360 HTG HRS ON: 1,408 5,376 H/C HRS ON: 2,294 8,760 CLG HRS SAVED: 2,480 HTG HRS SAVED: 3,968

6,466

**HOURS CALCULATIONS** 

C/H HRS SAVED:

ONSTANTS	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
НОАОН:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BUILDING NAME: SKILL DEV CTR

ENERGY CALCULATION SUMMARY

System Type: '15

BLDG: 6918

System Name: Small Single Zone air handling unit

System Number: AHU-2

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	2,923.29	28.65
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	2,000.49	6.48
Sub Total	0.00	5,061.68	35.13
Economizer	0.00	251.82	0.00
Ventilation/Recirculation	0.00	0.00	1.35
DDC Control	0.00	295.18	6.78
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.00	5,608,68	43.26

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95 PREPARED BY: AJN/CWW

11,507

# **ENERGY CALCULATION PARAMETERS**

SKILL DEV CTR
S

Building UA: 3,864 CONDITIONED SQFT:

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 21 BRICK AND CMU TRAINING 0700-2100 M-F Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	. 0	0,	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	21	17	0

<u>INPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,400
CFM-CLG:	1,400
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 880 3,360 HTG HRS ON: 1,408 5,376 H/C HRS ON: 2,294 8,760 CLG HRS SAVED: 2,480 HTG HRS SAVED: 3,968 C/H HRS SAVED:

6,466

HOURS CALCULATIONS

CONSTANTS	•
HOAUHC:	21.1
HOAUH:	- 34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 6918 BUILDING NAME: SKILL DEV CTR

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

FUNCTION -	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	2,923.29	28.65
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	2,000.49	6.48
Sub Total	0.00	5,061.68	35.13
Economizer	0.00	251.82	0.00
Ventilation/Recirculation	0.00	0.00	1.35
DDC Control	0.00	295.18	6.78
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		ı	3.0
TOTAL	0.00	5,608.68	43.26

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	6918	BUILDING NAME:	SKILL DEV CTR

**Building UA:** 3,864 **CONDITIONED SQFT:** 11,507

# SYTEM INFORMATION:

System Type: 16 System Name: Heating and Ventilating Unit System Number: MUA-1

# TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:		Use:		Occupancy HRS:	Occupancy Days:
	21 BRICK AND CMU		TRAINING		0700-2100	M-F
Weeks o	f Winter:	32		•		
Masks of 6		20				

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	21	17	0

#### **INPUTS** Motor HP: 1.50 **HP Effic:** 0.74 Load Factor: 0.80 CFM-HTG: 3,000 CFM-CLG: 0 %OA: 100% %Area: 0% CHILLER CAP (TONS): 0 KW-TON: 0.00 BLR CAP INPUT (BTUH): 0 BLR CAP OUTPUT (BTUH): 0

#### HOURS CALCULATIONS REQUIRED **PRESENT** HR/YR HR/YR CLG HRS ON: 880 3,360 HTG HRS ON: 1,408 5,376 H/C HRS ON: 2,294 8,760 CLG HRS SAVED: 2,480 HTG HRS SAVED: 3,968 C/H HRS SAVED: 6,466

CONSTANTS	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
НОАОН:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 6918 BUILDING NAME: SKILL DEV CTR

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MUA-1

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	4,800.21	404.74
Opt ST/SP	0.00	368.97	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	5,169.18	404.74
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	5,169.18	404.74 3.00

NCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	6918	<b>BUILDING NAME:</b>	SKILL DEV CTR

Building UA: 3,864 CONDITIONED SQFT: 11,507

#### SYTEM INFORMATION ...

System Type: 15
System Name: Small Single Zone air handling unit
System Number: RTU-1

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:

21 BRICK AND CMU TRAINING 0700-2100 M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	. 0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	21	17	0

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	4,000
CFM-CLG:	4,000
%OA:	15%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	-
HTG HRS SAVED:	3,968	-
C/H HRS SAVED:	6,466	-

ONSTANTS	
HOAUHC:	21,1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
НОАОН:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 6918 BUILDING NAME: SKILL DEV CTR

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: RTU-1

FUNCTION:	<u>kW/yr</u>	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	14,653.44	81.86	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	5,715.69	21.21	
Sub Total	0.00	21,060.36	103.07	
Economizer	0.00	719.49	0.00	
Ventilation/Recirculation	0.00	0.00	3.86	
DDC Control	0.00	843.38	22.19	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	0.00	22,623,23	129.12	3.0

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	6918	BUILDING NAME:	SKILL DEV CTR	
	Building UA:	3,864	CONDITIONED SQFT:	11,507

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: RTU-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
21	BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32		
Weeks of Su	ımmer:	20	•	

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	21	17	0

<u>inputs</u>	
Motor HP:	1.00
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,920
CFM-CLG:	1,920
%OA:	15%
%Area:	12%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	-
HTG HRS SAVED:	3,968	-
C/H HRS SAVED:	6.466	•

IIOAIIIIC .	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	. 0
COAUC:	0
HOAOHC:	17.3
НОАОН:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 6918

BUILDING NAME: SKILL DEV CTR

**ENERGY CALCULATION SUMMARY** 

System Type: 15

System Name: Small Single Zone air handling unit

System Number: RTU-2

FUNCTION -	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,846.57	39.29	The state of the s
Opt ST/SP	0.00	275.79	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	2,743.53	14.14	
Sub Total	0.00	8,865.90	53.43	
Economizer	0.00	345.35	0.00	
Ventilation/Recirculation	0.00	0.00	1.85	
DDC Control	0.00	404.82	14.79	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	-
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	9,616.08	70.08	3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**DATE:** 16-Sep-95

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:				
	Building UA:	3,864	CONDITIONED SQFT:	11,507
SYTEN	INFORMATION			

# System Type: 15 System Name: Small Single Zone air handling unit System Number: RTU-3

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	1 BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

SYSTEM OPERA	ATING S	CHEDUL	Ē				
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	21	17	0

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,920
CFM-CLG:	1,920
%OA:	15%
%Area:	12%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	880	3,36
HTG HRS ON:	1,408	5,37
H/C HRS ON:	2,294	8,76
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

<u>CONSTANTS</u>	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95 PREPARED BY: AJN/CWW

BLDG: 6918 BUILDING NAME: SKILL DEV CTR 

**ENERGY CALCULATION SUMMARY** 

System Type: 15

System Name: Small Single Zone air handling unit

System Number: RTU-3

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	5,846.57	39.29.	
Opt ST/SP	0.00	275.79	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	2,743.53	14.14	
Sub Total	0.00	8,865.90	53.43	
Economizer	0.00	345.35	0.00	
Ventilation/Recirculation	0.00	0.00	1.85	
DDC Control	0.00	404.82	14.79	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	9,616.08	70.08	3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	AND COS AO POINTS	DÌ	ARY AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	6918	BUILDING NAME:	SKILL DEV CTR	
	Building UA:	3,864	CONDITIONED SQFT:	11,507

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: RTU-4

TYPICAL BUILD	ING INFORMATIO	<u>N</u>		
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	1 BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0.	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	21	17	0

1.00	Motor HP:
0.66	HP Effic:
0.80	Load Factor:
1,920	CFM-HTG:
1,920	CFM-CLG:
15%	%OA:
12%	%Агеа:
0	CHILLER CAP (TONS):
0.00	KW-TON:
0	BLR CAP INPUT (BTUH):
0	BLR CAP OUTPUT (BTUH):

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 880 3,360 HTG HRS ON: 1,408 5,376 H/C HRS ON: 2,294 8,760 CLG HRS SAVED: 2,480 HTG HRS SAVED: 3,968 C/H HRS SAVED: 6,466

<u>CONSTANTS</u>	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 6918 BUILDING NAME: SKILL DEV CTR

ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit

System Number: RTU-4

....

0		39.29 0.00 0.00	
0			
0	.00	0.00	
	.00	0.00	
2,743	.53	14.14	
8,865	.90	53.43	
345	.35	0.00	
0	.00	1.85	
404	.82	14.79	
0	.00	0.00	
0	.00	0.00	
	.00	0.00	
0	.00	0.00	
	1		3.
	9,616	9,616,08	9,616.08 70.08

MCS NCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	6918	BUILDING NAME:	SKILL DEV CTR
	Building UA:	3,864	CONDITIONED SQFT: 11,507

## SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: RTU-5

I YPICAL BUILD Catagory Number:	ING INFORMATIO Construction:	N Use:	Occurrency UDS	
Catagory Hamber.	Construction.	OSe.	Occupancy HRS:	Occupancy Days:
2	1BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	9	9	0
REQ STOP:	0	17	17	17	21	17	0

<u>inputs</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	4,000
CFM-CLG:	4,000
%OA:	15%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 880 3,360 HTG HRS ON: 1,408 5,376 H/C HRS ON: 2,294 8,760 CLG HRS SAVED: 2,480 HTG HRS SAVED: 3,968 C/H HRS SAVED: 6,466

<u>CONSTANTS</u>	
HOAUHC:	21.1
HOAUH:	· 34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
НОАОН:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67
NSUCC: DDCCHC: DDCCC: NSC: DDCH: OPT: CHWR: CNWR:	0.00058 0.000091 0.00024 3050 3190 30

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 6918 BUILDING NAME: SKILL DEV CTR

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: RTU-5

- FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	14,653.44	81.86	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	5,715.69	21.21	
Sub Total	0.00	21,060.36	103.07	
Economizer	0.00	719.49	0.00	
Ventilation/Recirculation	0.00	0.00	3.86	
DDC Control	0.00	843.38	22.19	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	N. C. C. C. C. C. C. C. C. C. C. C. C. C.			3.0
TOTAL	0.00	22,623.23	129.12	3.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

## BUILDING 6940 INDOOR SWIMMING POOL

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95 PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG: 6940 BUILDING NAME: INDOOR SWIM POOL

**Building UA:** 3,037 CONDITIONED SQFT: 23,347

SYTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:	and the second	Use:	Occupancy HRS:	Occupancy Days:
1	5 BRICK AND CMU		SWIMMING POOL	0600-2200	M-F; SAT-SUN
Weeks of	Winter:	32			
Weeks of S	ummer:	20	•		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:		WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	11	11	11	11	11	11	11
REQ STOP:	20	20	20	20	20	20	20

<u>NPUTS</u>	Paris Medonis II
Motor HP:	2.00
HP Effic:	0.71
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,800,000
BLR CAP OUTPUT (BTUH):	2,240,000

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,260 3,360 HTG HRS ON: 2,016 5,376 H/C HRS ON: 3,285 8,760 **CLG HRS SAVED:** 2,100 HTG HRS SAVED: 3,360 C/H HRS SAVED: 5,475

ONSTANTS	
HOAUHC:	C
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000351
NSUCC:	0.000929
DDCCHC:	0.00000839
DDCCC:	0.0000222
NSC:	87100
DDCH:	34300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 6940 BUILDING NAME: INDOOR SWIM POOL

ENERGY CALCULATION SUMMARY

System Type:

System Name: Small hot water boiler

System Number: BLR-1

<u>kW/yr</u>	kWh/yr	<u>MBtu/yr</u> <u>MH/yr</u>	
0.00	5,648.59	0.00	
0.00	512.74	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	6,161.33	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	15.88	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
		,	4.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         5,648.59           0.00         512.74           0.00         0.00           0.00         0.00           0.00         0.00           0.00         6,161.33           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         5,648.59         0.00           0.00         512.74         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         6,161.33         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         15.88           0.00         0.00         0.00           0.00         0.00         0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	O	. 0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 6940 BUILDING NAME: INDOOR SI	WIM POOL
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**Building UA:** 3,037

CONDITIONED SQFT: 23,347

#### SYTEM INFORMATION

System Type: 17

System Name: Heating and Ventilating Unit with Return Fa

System Number: HRU-1

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 15 BRICK AND CMU SWIMMING POOL 0600-2200 M-F; SAT-SUN Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	. 0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	11	11	11	11	11	11	11
REQ STOP:	20	20	20	20	20	20	20

0

#### **INPUTS** Motor HP: 30.00 **HP Effic:** 0.87 Load Factor: 0.80 CFM-HTG: 24,800 CFM-CLG: 0 %OA: 100% 77% %Area: **CHILLER CAP (TONS):** 0 KW-TON: 0.00 **BLR CAP INPUT (BTUH):** 0 **BLR CAP OUTPUT (BTUH):**

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,260 3,360 HTG HRS ON: 2,016 5,376 H/C HRS ON: 3,285 8,760 **CLG HRS SAVED:** 2,100 HTG HRS SAVED: 3,360 C/H HRS SAVED: 5,475

<u>CONSTANTS</u>	
HOAUHC:	. 0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000351
NSUCC:	0.000929
DDCCHC:	0.00000839
DDCCC:	0.0000222
NSC:	87100
DDCH:	34300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 6940 BUILDING NAME: INDOOR SWIM POOL

## ENERGY CALCULATION SUMMARY

System Type: 17

System Name: Heating and Ventilating Unit with Return Fa

System Number: HRU-1

<b>FUNCTION</b>	<u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	69,385.74	0.00	
Opt ST/SP	0.00	6,298.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	61.10	
Sub Total	0.00	75,684.15	61.10	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	24.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	75,684.15	85.16	4.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**DATE:** 16-Sep-95

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

System Number: HV-2

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG: 6940	BUILDING N	NAME: INDOOR SWIM POOL	
Building UA:	3,037	CONDITIONED SQFT:	23,347
SYTEM INFORMATION	-		

# System Type: 16 System Name: Heating and Ventilating Unit

TYPICAL BUILD	ING INFORMATIO	N			
Catagory Number:	Construction:	cus sementario etta esta	Use:	Occupancy HRS:	Occupancy Days:
	6BRICK AND CMU		GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE SAT: FRI: SUN: MON: TUE: WED: THUR: 0 0 0 0 0 0 PRES START: 24 24 24 24 24 24 PRES STOP: 24 11 11 11 11 11 11 REQ START: 11 20 20 20 20 20 20 20 REQ STOP:

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,000
CFM-CLG:	C
%OA:	100%
%Area:	23%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	(
BLR CAP OUTPUT (BTUH):	

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		
HTG HRS ON:	2,016	5,376
H/C HRS ON:	3,285	8,760
CLG HRS SAVED:	2,100	)
HTG HRS SAVED	3,360	)
C/H HRS SAVED:	5,475	5

	/
AUHC:	20.9
DAUH:	33.6
AUHC:	0.000213
DAUC:	0.000562
AOHC:	27.8
DAOH:	44.
AOHC:	0.00039
DAOC:	0.0010
DUTY:	0.1
MAND:	0.1
ECC:	0.00002
ECHC:	0.000008
UCHC:	0.00063
SUCC:	0.0016
CCHC:	0.000014
DCCC:	0.000037
NSC:	42500
DDCH:	1100
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 6940 BUILDING NAME: INDOOR SWIM POOL

## ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-2

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u>	MH/yr
Schedule ST/SP	0.00	12,287.06	790.27	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	296.87	
Sub Total	0.00	13,402.40	1,087.14	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	7.68	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	ÃO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**DATE**: 16-Sep-95

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	6940	BUILDING NAME:	INDOOR SWIM POOL	
	Building UA:	3,037	CONDITIONED SQFT:	23,347

SYTEM INFORMATION	
System Type:	26
System Name:	Pump
System Number:	HWP-1

YPICAL BUILD Catagory Number:	ING INFORMATIO	<u>M</u>	Use:	Occupancy HRS:	Occupancy Days:
1	5 BRICK AND CMU		SWIMMING POOL	0600-2200	M-F; SAT-SUN
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	11	11	11	11	11	11	11
REQ STOP:	20	20	20	20	20	20	20

Motor HP:	1.00
WOLDI FIF.	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,260	3,360
HTG HRS ON:	2,016	5,376
H/C HRS ON:	3,285	8,760
CLG HRS SAVED:	2,100	
HTG HRS SAVED:	3,360	Ĩ
C/H HRS SAVED:	5,475	7

<u>ONSTANTS</u>	
HOAUHC:	(
HOAUH:	(
COAUHC:	
COAUC:	
HOAOHC:	
HOAOH:	
COAOHC:	
COAOC:	
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	A Maria P Maria Ration III
ECHC:	
NSUCHC:	0.00035
NSUCC:	0.00092
DDCCHC:	0.000083
DDCCC:	0.000022
NSC:	8710
DDCH:	3430
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO**: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: AJN/CWW

BLDG: 6940 BUILDING NAME: INDOOR SWIM POOL

ENERGY CALCULATION SUMMARY

 System Type:
 26

 System Name:
 Pump

 System Number:
 HWP-1

<u>FUNCTION</u>	- <u>kW/yr</u> -	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	2,897.76	0.00
Opt ST/SP	0.00	263.04	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	3,160.80	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	3,160.80	0.00 3.00

	TYPICAL SYSTEM	I POINT A	ND COST	r SUMMA	RY	
UMCS FUNCT		<b>DO</b>	AO	DI	ΑŢ	COST
NO.	VIII UMCS AFFEICATION		POINTS		POINTS	
24	Scheduled start/stop control -	1	0	1	. 0	\$386.00
	Pump; Optimum start/stop - Pump; Demand limiting - Pump					
	TOTAL:	777	0	1	0	\$386.00

# BUILDING 7017 BN HQ BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95 PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7017	BUILDING N	AME: BN HQ BLDG	
	Building UA:	1,162	CONDITIONED SQFT:	2,604
SYTEN	INFORMATION		and the second s	
	System Type: 8	4. (1. (1. (1. (1. (1. (1. (1. (1. (1. (1	and provinces and appropriate the second second second second second second second second second second second	AND THE PERSON NAMED IN COLUMN TO SERVICE AND ADDRESS OF THE PERSON NAMED ADDRESS OF THE PERSON NAMED ADDRESS OF THE PERSON NAMED ADDRESS
	System Name: Air coole	d DX compressor		
	System Number: ACCU-1			

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU		BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32	•		
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	. 0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	8
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	1
HTG HRS SAVED:	3,456	·
C/H HRS SAVED:	5,631	4

<u>CONSTANTS</u>	•
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7017 BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-1

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	140.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	6.73	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	6.73	140.00	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO	T SUMMA  DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95 PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7017	BUILDING NA	AME: BN HQ BLDG	
	Building UA:	1,162	CONDITIONED SQFT:	2,604
300 SE SE SE SE SE SE SE SE SE SE SE SE SE	INFORMATION	7 <b>.</b>		

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

Catagory Number:	Construction:	Use:	Oc	cupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALIC	ON 070	00-1800	M-F; SAT
Weeks o	f Winter:	32			
Weeks of S	Summer:	20	•		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	Ō
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

B8 - 4 11B -	4.00
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	3,250
CFM-CLG:	3,250
%OA:	25%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	1,200	3,360
HTG HRS ON	1,920	5,376
H/C HRS ON	3,129	8,760
CLG HRS SAVED	2,160	
HTG HRS SAVED	3,456	
C/H HRS SAVED	5,631	-

CARCINESTITUTE OF COMMUNICATION COMUNICATION COMMUNICATION COMMUNICATION COMMUNICATION COMMUNICATION	The state of the s
16.2	HOAUHC:
26.1	HOAUH:
0.000257	COAUHC:
0.00068	COAUC:
33.3	HOAOHC:
53.5	нолон:
0.00115	COAOHC:
0.00305	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.00021	ECC:
0.0000795	ECHC:
0.000941	NSUCHC:
0.00249	NSUCC:
0.000233	DDCCHC:
0.000616	DDCCC:
36600	NSC:
30100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

EMC NO: 1406-001

BLDG: 7017 BUILDING NAME: BN HQ BLDG

**ENERGY CALCULATION SUMMARY** 

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

<u>FUNCTION</u>	· <u>kWlyr</u> -	<u>kWhiyr</u>	<u>MBtulyr</u>	MH/yr
Schedule ST/SP	0.00	6,032.61	74.12	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	1.76	0.00	0.00	
Night Setback	0.00	17,222.32	42.53	
Sub Total	1.76	23,517.97	116.65	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,369.11	34.98	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		ı		3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

# BUILDING 7024 GYMNASIUM

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

DI DO	7004	BUILDING NAME:	CYMNIASILIM	
BLDG:	1024	BUILDING NAME.	O I WII WAO IO WI	

Building UA: 2,682 CONDITIONED SQFT: 20,619

#### SYTEM INFORMATION

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

#### TYPICAL BUILDING INFORMATION

Catagory Number: Construction:	Use:	Occupancy HRS:	Occupancy Days:
16 BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

· 0/1/0000000000000000000000000000000000	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	. 0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

#### **INPUTS** 0.00 Motor HP: 0.00 HP Effic: 0.80 Load Factor: CFM-HTG: 0 0 CFM-CLG: 0% %OA: 0% %Area: 0 CHILLER CAP (TONS): 0.00 KW-TON: 2,898,000 **BLR CAP INPUT (BTUH): BLR CAP OUTPUT (BTUH):** 2,318,000

# HOURS CALOUDATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

<u>CONSTANTS</u>	
HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
НОАОН:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	309
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 09-Dec-95
PREPARED BY: AJN/CWW

BLDG: 7024 BUILDING NAME: GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type: 3
System Name: Small steam boiler

System Number: BLR-1

FUNCTION	<u>kWlyr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring,			4.0
Maintenance, Run Time, and Safety Alarms		!	:
TOTAL	0.00	0.00	9.00 4.0

LUMCS REINCTA NO.	The state of the s	<b>DO</b> 72	AO	DI .	RY A1 POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TOTAL	: 1	0	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7024	BUILDING NAME:	GYMNASIUM	
	Building UA:	2,682	CONDITIONED SQFT:	20,619

## SYTEMINFORMATION:

System Type: 3

System Name: Small steam boiler

System Number: BLR-2

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	6 BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

<u>nputs</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	650,000
BLR CAP OUTPUT (BTUH):	520,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	
C/H HRS SAVED:	3,806	

<u>CONSTANTS</u>	
HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
НОАОНС:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 09-Dec-95

PREPARED BY: AJN/CWW

BLDG: 7024 BUILDING NAME: GYMNASIUM

**ENERGY CALCULATION SUMMARY** 

System Type: 3

System Name: Small steam boiler

System Number: BLR-2

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/vr	MH/vr
Schedule ST/SP	0.00	.00	0.00	Zi. 2004. 19. 19. 19. 19. 19. 19. 19. 19. 19. 19
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	· · · · · · · · · · · · · · · · · · ·
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		1	:	4.0
TOTAL	0.00	0.00	0.00	4.0

UMCS					RY	
FUNCTI NO.	Steam Boiler Monitoring	POINTS 1	AO POINTS	POINTS	AI. POINTS	COST
	TOTAL		0	. <b>3</b>	1	\$1,015.00 \$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7024	BUILDING NAME:	GYMNASIUM

Building UA: CONDITIONED SQFT: 2,682 20,619

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: FC-1

#### TYPICAL BUILDING INFORMATION ... Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 16 BRICK AND CMU **GYMNASIUM** 0600-2200 M-F; SAT-SUN Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	,SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

Motor HP:	0.12
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	1,250
CFM-CLG:	0
%OA:	100%
%Агеа:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON	1,900	3,360
HTG HRS ON	3,040	5,376
H/C HRS ON	4,954	8,760
CLG HRS SAVED	1,460	ī
HTG HRS SAVED	2,336	•
C/H HRS SAVED	3,806	

	<u>CONSTANTS</u>
20.9	HOAUHC:
33.6	HOAUH:
0.000213	COAUHC:
0.000562	COAUC:
27.8	HOAOHC:
44.7	нолон:
0.000391	COAOHC:
0.00103	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000022	ECC:
0.0000083	ECHC:
0.000637	NSUCHC:
0.00168	NSUCC:
0.0000143	DDCCHC:
0.0000378	DDCCC:
425000	NSC:
11000	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7024 BUILDING NAME: GYMNASIUM

**ENERGY CALCULATION SUMMARY** 

System Type: 16

System Name: Heating and Ventilating Unit

System Number: FC-1

FUNCTION -	<u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	261.40	98.11	
Opt ST/SP	0.00	34.13	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	56.99	
Sub Total	0.00	295.53	155.10	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	1.48	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	0.00	295.53	156.58	3.0

	TYPICAL SYSTEM	POINT A	ND COS	TSUMM	ARY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
	TOTAL:	1	2	0	4	\$1,433.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DAT

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

20,619

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 7024 BUILDING NAME: GYMNASIUM

Building UA: 2,682 CONDITIONED SQFT:

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: FC-2

TYPICAL BUILD	ING INFORMATIC	<u>N</u>		
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	6 BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS	
Motor HP:	0.12
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	1,250
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	7
HTG HRS SAVED:	2,336	ř
C/H HRS SAVED:	3,806	

<u>ONSTANTS</u>	
HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

**BUILDING NAME: GYMNASIUM** BLDG: 7024

#### **ENERGY CALCULATION SUMMARY**

System Type: 16

198

System Name: Heating and Ventilating Unit

System Number: FC-2

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	261.40	98.11	
Opt ST/SP	0.00	34.13	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	56.99	
Sub Total	0.00	295.53	155.10	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	1.48	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	295,53	156.58	3.00

UMCS TUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG: 7024 BUI	ILDING NAME:	GYMNASIUM
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Building UA: 2,682 CONDITIONED SQFT: 20,619

#### SYTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days	
16 BRICK AND CMU			GYMNASIUM	0600-2200	M-F; SAT-SUN	
Weeks of	f Winter:	32				
Weeks of S	Summer:	20				

#### SYSTEM OPERATING SCHEDULE

99900 Bassa	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

1.50	Motor HP:
0.74	HP Effic:
0.80	Load Factor:
8,300	CFM-HTG:
0	CFM-CLG:
100%	%OA:
18%	%Area:
0	CHILLER CAP (TONS):
0.00	KW-TON:
C	BLR CAP INPUT (BTUH):
0	BLR CAP OUTPUT (BTUH):

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR CLG HRS ON: 1,900 3,360 5,376 3,040 HTG HRS ON: 8,760 H/C HRS ON: 4,954 CLG HRS SAVED: 1,460 2,336 HTG HRS SAVED: 3,806 C/H HRS SAVED:

<u>CONSTANTS</u>	
HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
НОАОН:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7024 BUILDING NAME: GYMNASIUM

**ENERGY CALCULATION SUMMARY** 

System Type: 16
System Name: Heating and Ventilating Unit

System Number: HV-1

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/	红
0.00	2,825.93	651.46	
0.00	368.97	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	205.17	
0.00	3,194.90	856.64	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	5.31	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         2,825.93           0.00         368.97           0.00         0.00           0.00         0.00           0.00         0.00           0.00         3,194.90           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00     2,825.93     651.46       0.00     368.97     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     205.17       0.00     3,194.90     856.64       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     5.31       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7024	BUILDING NAME:	GYMNASIUM	
	Building UA:	2,682	CONDITIONED SQFT:	20,619
		· ·		

# SYTEM INFORMATION System Type: 16

System Name: Heating and Ventilating Unit
System Number: HV-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	6 BRICK AND CMU	GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0.	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

INPUTS.	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,300
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	)
HTG HRS SAVED:	2,336	,
C/H HRS SAVED:	3,806	;

11041110	
HOAUHC:	20
HOAUH:	33
COAUHC:	0.0002
COAUC:	0.00056
HOAOHC:	27
HOAOH:	44
COAOHC:	0.00039
COAOC:	0.0010
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00002
ECHC:	0.00000
NSUCHC:	0.00063
NSUCC:	0.0016
DDCCHC:	0.000014
DDCCC:	0.000037
NSC:	42500
DDCH:	1100
OPT:	30
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7024 BUILDING NAME: GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-2

FUNCTION -	kW/yr	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>I</u>	<i>VHVt</i>
Schedule ST/SP	0.00	2,825.93	651.46	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.17	
Sub Total	0.00	3,194.90	856.64	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.31	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	0.00	3,194.90	861.95	3.0

TYPICAL SYSTEM POINT AND COST SUMMARY						
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
	TOTAL:	1	2	0	4	\$1,433.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7024	BUILDING NAME: GYMNASIUM

Building UA: 2,682 CONDITIONED SQFT: 20,619

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-3

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 16 BRICK AND CMU GYMNASIUM 0600-2200 M-F; SAT-SUN Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

Million and the second	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

1.50	4 11D
1.30	Motor HP:
0.74	HP Effic:
0.80	Load Factor:
8,300	CFM-HTG:
(	CFM-CLG:
100%	%QA:
18%	%Area:
(	CHILLER CAP (TONS):
0.00	KW-TON:
	BLR CAP INPUT (BTUH):
	BLR CAP OUTPUT (BTUH):

#### HOURS CALCULATIONS PRESENT REQUIRED HR/YR HR/YR 3,360 CLG HRS ON: 1,900 5,376 HTG HRS ON: 3,040 8,760 4,954 H/C HRS ON: 1,460 CLG HRS SAVED: 2,336 HTG HRS SAVED: 3,806 C/H HRS SAVED:

<u>ONSTANTS</u>	
HOAUHC:	20.
HOAUH:	33.
COAUHC:	0.00021
COAUC:	0.00056
HOAOHC:	27.
НОАОН:	44.
COAOHC:	0.00039
COAOC:	0.0010
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00002
ECHC:	0.00000
NSUCHC:	0.00063
NSUCC:	0.0016
DDCCHC:	0.000014
DDCCC:	0.000037
NSC:	42500
DDCH:	1100
OPT:	30
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7024 BUILDING NAME: GYMNASIUM

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-3

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	2,825.93	651.46
Opt ST/SP	0.00	368.97	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	205.17
Sub Total	0.00	3,194.90	856.64
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	5.31
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			861 95 · 3

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

**DATE:** 16-Sep-95

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7024	BUILDING NAME	E: GYMNASIUM	
	Building UA:	2,682	CONDITIONED SQFT:	20,619
SYTEM	INFORMATION			*** ***
	System Type: 16		Control of the second s	a.a. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10

SYMEMINEORMATION	The state of the s
System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	HV-4
	· · · · · · · · · · · · · · · · · · ·

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1	6 BRICK AND CMU		GYMNASIUM	0600-2200	M-F; SAT-SUN
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

SYSTEM OPERA	TING S	CHEDUI	F				
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,300
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,900	3,360
HTG HRS ON:	3,040	5,376
H/C HRS ON:	4,954	8,760
CLG HRS SAVED:	1,460	
HTG HRS SAVED:	2,336	1
C/H HRS SAVED:	3,806	-

HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
HOAOHC:	27.8
HOAOH:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	17.5
CHANK.	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BUILDING NAME: GYMNASIUM

**ENERGY CALCULATION SUMMARY** 

System Type: 16
System Name: Heating and Ventilating Unit

System Number: HV-4

BLDG: 7024

FUNCTION:	kW/yr	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	2,825.93	651.46	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.17	
Sub Total	0.00	3,194.90	856.64	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.31	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	3,194.90	861.95	, 3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

20,619

PREPARED BY: AJN/CWW

# LOCATION: FT. RILEY, KS

## **ENERGY CALCULATION PARAMETERS**

	BLDG:	7024	BUILDING NAME:	GYMNASIUM
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**Building UA:** CONDITIONED SQFT: 2,682

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-5

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 16 BRICK AND CMU GYMNASIUM 0600-2200 M-F; SAT-SUN Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	'SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	. 24	24	24	24	24	24
REQ START:	9	6	6	6	6	6	9
REQ STOP:	19	21	21	21	21	21	19

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	8,300
CFM-CLG:	0
%OA:	100%
%Area:	18%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR	-
CLG HRS ON:			360
HTG HRS ON:	3,040	5,	376
H/C HRS ON:	4,954	8,	760
CLG HRS SAVED:	1,460	- I	
HTG HRS SAVED:	2,336	-	
C/H HRS SAVED:	3,806		

<u>ONSTANTS</u>	
HOAUHC:	20.9
HOAUH:	33.6
COAUHC:	0.000213
COAUC:	0.000562
НОАОНС:	27.8
ноаон:	44.7
COAOHC:	0.000391
COAOC:	0.00103
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000022
ECHC:	0.0000083
NSUCHC:	0.000637
NSUCC:	0.00168
DDCCHC:	0.0000143
DDCCC:	0.0000378
NSC:	425000
DDCH:	11000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7024 BUILDING NAME: GYMNASIUM

#### **ENERGY CALCULATION SUMMARY**

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-5

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtulyr</u>	MH/yr
Schedule ST/SP	0.00	2,825.93	651.46	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	205.17	
Sub Total	0.00	3,194.90	856.64	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	5.31	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	0.00	3,194.90	861.95	3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

## BUILDING 7028 BN CLASSROOMS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7028	BUILDING NAME:	BN CLASSROOMS	
	Building UA:	1,723	CONDITIONED SQFT:	3,733

#### SYTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU		BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

#10 arm 1000000000 a - \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	. 0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	18	18	18	18	18	0

<u>NPUTS</u>			
Motor HP:	0.16		
HP Effic:	0.64		
Load Factor:	0.80		
CFM-HTG:	0		
CFM-CLG:	0		
%OA:	0%		
%Area:	0%		
CHILLER CAP (TONS):	0		
KW-TON:	0.00		
BLR CAP INPUT (BTUH):	659,000		
BLR CAP OUTPUT (BTUH):	527,000		

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,300	3,360
HTG HRS ON:	2,080	5,376
H/C HRS ON:	3,389	8,760
CLG HRS SAVED	2,060	)
HTG HRS SAVED	3,296	;
C/H HRS SAVED	5,371	- -

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	(
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7028

BUILDING NAME: BN CLASSROOMS

#### **ENERGY CALCULATION SUMMARY**

System Type:

Small hot water boiler System Name:

System Number: BLR-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	491.76	0.00
Opt ST/SP	0.00	45.51	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	537.27	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	3.74
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.00
TOTAL	0.00	537.27	3,74

	TYPICAL SYSTEN	I POINT A	ND COS	TSUMMA	<b>IRY</b>	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	O	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	3	<b>\$1,443.00</b>

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95 PREPARED BY: AJN/CWW

EMC NO: 1406-001

## **ENERGY CALCULATION PARAMETERS**

BLDG: 7028 BUILDING NAME: BN CLASSROOMS	BLDG:	7028	BUILDING NAME:	BN CLASSROOMS	
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DLDG. 10	20	BUILDING	MAINE. DIN CLASSICOUNS	
	Building UA:	1,723	CONDITIONED SQFT:	3,733

#### SYTEM INFORMATION

-	· // // // // // // // // // // // // //	ALASS.	W.X.	i de se assista	.c.:	32
S	yste	m	Ty	pe:	24	
			-			

System Name: Dual temperature water pump

System Number: DTWP-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	18	18	18	18	18	0

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,300 3,360 HTG HRS ON: 2,080 5,376 H/C HRS ON: 3,389 8,760 CLG HRS SAVED: 2,060 HTG HRS SAVED: 3,296 C/H HRS SAVED: 5,371

<u>NSTANTS</u>	TANKO SENATE EZIYA
HOAUHC:	16
HOAUH:	26
COAUHC:	0.00025
COAUC:	0.0006
HOAOHC:	33
НОАОН:	53
COAOHC:	0.0011
COAOC:	0.0030
DC DUTY:	0.1
DC DEMAND:	0.7
ECC:	0.0002
ECHC:	0.000079
NSUCHC:	0.00094
NSUCC:	0.0024
DDCCHC:	0.00023
DDCCC:	0.00061
NSC:	3660
DDCH:	3010
OPT:	30
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7028 BUILDING NAME: BN CLASSROOMS

ENERGY CALCULATION SUMMARY

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u> –	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	6,497.11	0.00	
Opt ST/SP	0.00;	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.47	6,866.08	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  - UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMMA DI POINTS	RY AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
	TOTAL:	1	0	1	4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7028	BUILDING NAME:	BN CLASSROOMS

**Building UA:** 1,723

CONDITIONED SQFT: 3,733

<u>SYTEM INFORMATION</u>

System Type: 19

System Name: Fan coil unit

System Number: FC-1

atagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	18	18	18	18	18	0

<u>inputs</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	4,400
CFM-CLG:	4,400
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR	<u>r</u>
CLG HRS ON	1,300	. 3	3,360
HTG HRS ON	2,080		5,376
H/C HRS ON:	3,389		3,760
CLG HRS SAVED	2,060	-	
HTG HRS SAVED	3,296	•	
C/H HRS SAVED:	5,371	•	

CONSTANTS			
16.2	HOAUHC:		
26.1	HOAUH:		
0.000257	COAUHC:		
0.00068	COAUC:		
33.3	HOAOHC:		
53.5	ноаон:		
0.00115	COAOHC:		
0.00305	COAOC:		
0.17	DC DUTY:		
0.17	DC DEMAND:		
0.00021	ECC:		
0.0000795	ECHC:		
0.000941	NSUCHC:		
0.00249	NSUCC:		
0.000233	DDCCHC:		
0.000616	DDCCC:		
36600	NSC:		
30100	DDCH:		
305	OPT:		
17.5	CHWR:		
0	CNWR:		
5.67	OAR:		

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG:	7028
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BUILDING NAME: BN CLASSROOMS
ENERGY CALCULATION SUMMARY

\_\_\_\_\_

System Type:

19

System Name: System Number: Fan coil unit

System Number: FC-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	4,631.85	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	22,236.91	63.06	
Sub Total	0.00	27,131.80	63.06	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMM/ DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

## BUILDING 7031 BN HQ BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	BLDG: 7031 BUILDING NAME: BN HQ BLDG				
	Building UA:	1,723	CONDITIONED SQFT:	3,733	
SYTEMI	<u>NFORMATION</u>	A CONTRACTOR OF THE CONTRACTOR			

STIEMINEURMATION	
System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F, SAT
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0,	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	18	18	18	18	18	0

Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	C
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	(
KW-TON:	0.00
BLR CAP INPUT (BTUH):	528,000
BLR CAP OUTPUT (BTUH):	381,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,300	3,360
HTG HRS ON:	2,080	5,376
H/C HRS ON:	3,389	8,760
CLG HRS SAVED:	2,060	)
HTG HRS SAVED:	3,296	5.
C/H HRS SAVED:	5,371	<del></del>

<u>ONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	(
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7031 BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 1

System Name: |Small hot water boiler

System Number: BLR-1

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	2.99
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.
TOTAL	0.00	0.00	2.99

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO	DI	ARY AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7031	BUILDING N	IAME: E	BN HQ BLDG	
	Building UA:	1,723		CONDITIONED SQFT:	3,733
SYTEM	INFORMATION -				All the Estate
	System Type: 24			Control of the Contro	and the second second second second second second second second second second second second second second seco
	System Name: Dual tem	perature water pump		<del></del>	
	System Number: DTWP-1				

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32	•	
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	. 5	5	5	. 5	5	0
REQ STOP:	0	18	18	18	18	18	0

<u>INPUTS</u>	
Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,300	3,360
HTG HRS ON:	2,080	5,376
H/C HRS ON:	3,389	8,760
CLG HRS SAVED:	2,060	
HTG HRS SAVED:	3,296	7 ;
C/H HRS SAVED:	5,371	7

<u>NSTANTS</u>	
HOAUHC:	16.
HOAUH:	26.
COAUHC:	0.00025
COAUC:	0.0006
HOAOHC:	33.
HOAOH:	53.
COAOHC:	0.0011
COAOC:	0.0030
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.0002
ECHC:	0.000079
NSUCHC:	0.00094
NSUCC:	0.0024
DDCCHC:	0.00023
DDCCC:	0.00061
NSC:	3660
DDCH:	3010
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

EMC NO: 1406-001

BLDG: 7031 BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	3,642.32	0.00
Opt ST/SP	0.00	206.85	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.38	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	1.38	3,849.17	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3,1
TOTAL	1.38	3,849.17	0.00 3.

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST 1
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
	TOTAL:	1	0	1	4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

0700-1800

LOCATION: FT. RILEY, KS PREPA

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

3,733

M-F; SAT

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7031	BUILDING NAME:	BN HQ BLDG	
	Building UA:	1,723	CONDITIONED SQFT:	

SYTEM INFORMATION

System Type: 19
System Name: Fan coil unit
System Number: FC-1

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:

BATTALION

Weeks of Winter: 32
Weeks of Summer: 20

7 BRICK AND CMU

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	18	18	18	18	18	0

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	4,400
CFM-CLG:	4,400
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,300	3,360
HTG HRS ON:	2,080	5,376
H/C HRS ON:	3,389	8,760
CLG HRS SAVED:	2,060	)
HTG HRS SAVED	3,296	5
C/H HRS SAVED:	5,371	_  -

HOUSE CALCULATIONS

<u>CONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7031 BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 19
System Name: Fan coil unit

System Number: FC-1

FUNCTION.	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	4,631.85	0.00
Opt ST/SP	0.00	263.04	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	22,236.91	63.06
Sub Total	0.00	27,131.80	63.06
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			C
and Safety Alarms	0.00	27,131,80	63.06

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO	AO	DI	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

## BUILDING 7033 BN HQ BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY:

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7033	BUILDING NAME:	BN HQ BLDG	
	Building UA:	1,960	CONDITIONED SQFT:	4,083

	L	-
SYTEM INFORMATION		2000 0000
System Type:	15	
System Name:	Small Single Zone air handling unit	
System Number:	AHU-1	

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

SYSTEM OPERA	TING S	CHEDU	LE :				
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

Motor HP:	2.00
wiotor ne.	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,400
CFM-CLG:	4,400
%OA:	15%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	•
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	-

<u>CONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG:		BUILDING NAME:	
proprieses (1) proprieses (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	MARKET CONTRACTOR OF STREET		MORE COMMERCED BY COMMERCE AND A PROPERTY OF THE PROPERTY OF T

ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit

System Number: AHU-1

<u>FUNCTION</u>	kW/yr	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	10,015.91	63.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	24,395.83	71.74	
Sub Total	3.12	34,878.47	134.73	
Economizer	0.00	1,003.18	0.00	
Ventilation/Recirculation	0.00	51.73	3.26	
DDC Control	0.00	2,940.13	59.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	3.12	38,873.51	196.99	3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

**DATE:** 16-Sep-95

**ENERGY CALCULATION PARAMETERS** 

BLDG:	7033		BUILDING NAME:	BN HQ BLDG	
	Building UA:		1,960	CONDITIONED SQFT:	4,083
YTEN	INFORMATION				
. ACUE . ORNET ACO	MINITED AND A SECTION OF THE PART OF THE P				
	System Type:	1			
	System Type: System Name:	<del></del>	er boiler		

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU		BATTALION	0700-1800	M-F; SAT
Weeks of	f Winter:	32	-		
Weeks of S	lummer:	20			

SYSTEM OPERA	TING S	CHEDUL	E				
ONLOCOCONOMICA CONTRACTOR CONTRAC	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

Motor HP:	0.32
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	299,000
BLR CAP OUTPUT (BTUH):	229,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,370
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	j.
HTG HRS SAVED:	3,616	· •
C/H HRS SAVED:	5,892	- !

	<u>ONSTANTS</u>
16.2	HOAUHC:
26.1	HOAUH:
0.00025	COAUHC:
0.00068	COAUC:
33.3	HOAOHC:
53.5	НОАОН:
0.0011	COAOHC:
0.0030	COAOC:
0.1	DC DUTY:
0.1	DC DEMAND:
0.0002	ECC:
0.000079	ECHC:
0.00094	NSUCHC:
0.0024	NSUCC:
0.00023	DDCCHC:
0.00061	DDCCC:
3660	NSC:
3010	DDCH:
30	OPT:
17.	CHWR:
(	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7033 BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	1,079.01	0.00
Opt ST/SP	0.00	91.01	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	1,170.03	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	1.70
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.00
TOTAL	0.00	1,170.03	1.70 4.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

## BUILDING 7034 CLINIC W/O BEDS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY:

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7034	BUILDING NAME	: CLINIC W/O BEDS	
	Building UA:	1 595	CONDITIONED SOFT:	3.842

## SYTEMINEORMATION .....

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	0 BRICK AND CMU	DENTAL CLINIC	0800-1700	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	3,720
CFM-CLG:	3,720
%OA:	20%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	- )
HTG HRS SAVED:	3,776	j
C/H HRS SAVED:	6,153	\$

CONSTANTS				
HOAUHC:	50.2			
HOAUH:	80.7			
COAUHC:	0.00121			
COAUC:	0.0032			
нолонс:	45.3			
нолон:	72.8			
COAOHC:	0.0017			
COAOC:	0.0045			
DC DUTY:	0.17			
DC DEMAND:	0.17			
ECC:	0.000826			
ECHC:	0.000312			
NSUCHC:	0.000143			
NSUCC:	0.000379			
DDCCHC:	0.000119			
DDCCC:	0.000316			
NSC:	36000			
DDCH:	40300			
OPT:	305			
CHWR:	17.5			
CNWR:	0			
OAR:	5.67			

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

EMC NO: 1406-001 **DATE:** 16-Sep-95

PREPARED BY:

BLDG: 7034

BUILDING NAME: CLINIC W/O BEDS

**ENERGY CALCULATION SUMMARY** 

10 System Type:

Multizone air handling unit System Name:

System Number: AHU-1

<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u>	<u>MH/yr</u>
0.00	28,039.20	229.80	
0.00	1,115.34	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	3,273.07	57.42	
0.00	32,427.62	287.22	
0.00	3,025.95	0.00	
0.00	274.57	11.39	
0.00	1,154.13	64.28	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			5.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         28,039.20           0.00         1,115.34           0.00         0.00           0.00         0.00           0.00         3,273.07           0.00         32,427.62           0.00         3,025.95           0.00         274.57           0.00         1,154.13           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         28,039.20         229.80           0.00         1,115.34         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         3,273.07         57.42           0.00         32,427.62         287.22           0.00         3,025.95         0.00           0.00         274.57         11.39           0.00         1,154.13         64.28           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	<b>ARY</b>	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	8	1	11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO:** 1406-001 **DATE:** 09-Dec-95

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LOCATION: FT. RILEY, KS

PREPARED BY:

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7034	BUILDING NAME:	CLINIC W/O BEDS
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BUILDING NAME. CLINIC W/O BEDS

Building UA: 1,595 CONDITIONED SQFT:

3,842

## SYTEM INFORMATION

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

# YPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 10 BRICK AND CMU DENTAL CLINIC 0800-1700 M-F Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7.	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>NPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	468,000
BLR CAP OUTPUT (BTUH):	281,000

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	: : :
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

<u>ONSTANTS</u>	
HOAUHC:	50.2
HOAUH:	80.7
COAUHC:	0.00121
COAUC:	0.0032
HOAOHC:	45.3
НОАОН:	72.8
COAOHC:	0.0017
COAOC:	0.0045
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000826
ECHC:	0.000312
NSUCHC:	0.000143
NSUCC:	0.000379
DDCCHC:	0.000119
DDCCC:	0.000316
NSC:	36000
DDCH:	40300
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY:

BLDG: 7034 BUILDING NAME: CLINIC W/O BEDS

ENERGY CALCULATION SUMMARY

| System Type: 3 | System Name: Small steam boiler

System Number: BLR-1

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/	Ϋ́
Schedule ST/SP	0.00	.00	0.00	20,2000,000,000
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			,	4.00
TOTAL	0.00	0.00	0.00	4.00

EUMCS FUNCT NO.	The state of the s	SYSTEM POIN FION DO POINT	AO 🗆	DI .	RY AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
		TOTAL: 1	0	3	1	\$1,015.00

## BUILDING 7036 REGIMENTAL HQ BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

**Building UA:** 2,605 CONDITIONED SQFT: 10,010

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	18	18	18	18	18	0

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	1,787
CFM-CLG:	1,787
%OA:	0%
%Area:	28%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,300	3,360
HTG HRS ON:	2,080	5,376
H/C HRS ON:	3,389	8,760
CLG HRS SAVED:	2,060	<del>.</del> !
HTG HRS SAVED:	3,296	- i
C/H HRS SAVED:	5,371	

CONSTANTS		
	HOAUHC:	16.2
,	HOAUH:	26.1
	COAUHC:	0.000257
	COAUC:	0.00068
	HOAOHC:	33.3
	HOAOH:	53.5
	COAOHC:	0.00115
	COAOC:	0.00305
	DC DUTY:	0.17
DC	DEMAND:	0.17
	ECC:	0.00021
	ECHC:	0.0000795
	NSUCHC:	0.000941
	NSUCC:	0.00249
	DDCCHC:	0.000233
	DDCCC:	0.000616
	NSC:	36600
	DDCH:	30100
	OPT:	305
	CHWR:	17.5
****** * -*	CNWR:	0
	OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7036  BUILDING NAME: REGIMENTAL HQ BLDG

#### ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

AHU-1 System Number:

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	6,497.11	0.00
Opt ST/SP	0.00	368.97	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	2.47	0.00	0.00
Night Setback	0.00	9,031.22	26.70
Sub Total	2.47	15,897.30	26.70
Economizer	0.00	481.50	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	1,411.20	21.95
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	2.47	17,790.00	48.65

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

**DATE**: 16-Sep-95

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7036		BUILDING	NAME:	REGIMENTAL HQ BLDG	
	Building UA:		2,605	-	CONDITIONED SQFT:	10,010
SYTEM	INFORMATION					
	System Type:	1		7 A A Green Pictor Statement	gater das values (Microsoft of the destruction of t	
	System Name:	Small hot w	ater boiler		:	
	System Number:	BLR-1			i	

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	2BRICK AND CMU		ADMINISTRATION	0600-1700	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

Balislasijos partira miki					A Light of States that I have been	usi altelass	
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAI:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0.	5	5	5	5	5	0
REQ STOP:	0	18	18	18	18	18	0

<u>inputs</u>	
Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	864,000
BLR CAP OUTPUT (BTUH):	591,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,300	3,360
HTG HRS ON:	2,080	5,376
H/C HRS ON:	3,389	8,760
CLG HRS SAVED:	2,060	- 
HTG HRS SAVED:	3,296	···
C/H HRS SAVED:	5,371	-

CONSTANTS	
HOAUHC:	(
HOAUH:	(
COAUHC:	(
COAUC:	(
HOAOHC:	(
нолон:	(
COAOHC:	(
COAOC:	(
DC DUTY:	0.17
DC DEMAND:	0.1
ECC:	(
ECHC:	
NSUCHC:	0.000176
NSUCC:	0.00046
DDCCHC:	0.00011
DDCCC:	0.000294
NSC:	1090
DDCH:	3250
OPT:	30:
CHWR:	17.:
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7036 BUILDING NAME: REGIMENTAL HQ BLDG

#### ENERGY CALCULATION SUMMARY

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	2,235.29	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle:	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	2,442.13	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	4.90	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				4.0

Maintenance, Run Time,
and Safety Alarms

TOTAL 0.00 2,442.13 4.90 4.90 4.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	. 0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7036	BUILDING NAME:	REGIMENTAL HQ BLDG

**Building UA:** 2,605 **CONDITIONED SQFT:** 

10,010

#### SYTEM INFORMATION\_

System Type: 19

System Name: Fan coil unit

System Number: FC-1

2 BRICK AND CMU

Occupancy HRS: ADMINISTRATION 0600-1700

Occupancy Days:

M-F

Weeks of Winter: Weeks of Summer: 32 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	18	18	18	18	18	0

# <u>INPUTS</u>

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	10,100
CFM-CLG:	10,100
%OA:	0%
%Area:	36%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

REQUIRED HR/YR	PRESENT HR/YR
1,300	3,360
2,080	5,376
3,389	8,760
2,060	•
3,296	•
5,371	,
֡	1,300 2,080 3,389 2,060 3,296

#### **CONSTANTS**

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7036 BUILDING NAME: REGIMENTAL HQ BLDG

						C									

System Type: 19
System Name: Fan coil unit
System Number: FC-1

FUNCTION -	<u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,642.32	0.00	<u> </u>
Opt ST/SP	0.00	206.85	0.00	1494.45
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	9,546.98	10.22	
Sub Total	0.00	13,396.15	10.22	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	13,396.15	10.22	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	AO+	T SUMMA DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213:00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

LOCATION: FT. RILEY, KS

PREPARED BY: A

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7036	BILL DING NAME:	REGIMENTAL HQ BLDG
DLUG.	1030	DUILDING NAME.	REGINIENTAL FIQ BLUG

Building UA: 2,605 CONDITIONED SQFT: 10,010

#### SYTEM INFORMATION ...

System Type: 19
System Name: Fan coil unit
System Number: FC-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU	ADMINISTRATION	0600-1700	M-F
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	18	18	18	18	18	0

INPUTS	
Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	10,100
CFM-CLG:	10,100
%OA:	0%
%Area:	36%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,300 3,360 HTG HRS ON: 2,080 5,376 H/C HRS ON: 3,389 8,760 CLG HRS SAVED: 2,060 HTG HRS SAVED: 3,296 C/H HRS SAVED: 5,371

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

System Number:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95 PREPARED BY: AJN/CWW

EMC NO: 1406-001

BLDG: 7036 BUILDING NAME: REGIMENTAL HQ BLDG 

#### ENERGY CALCULATION SUMMARY

19 System Type: Fan coil unit System Name: FC-2

FUNCTION :	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	3,642.32	0.00
Opt ST/SP	0.00	206.85	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	9,546.98	10.22
Sub Total	0.00	13,396.15	10.22
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:	0.00
TOTAL	0.00	13,396.15	10.22 , 0.00

UMCS FUNCTN NO:	TYPICAL SYSTEM UMCS APPLICATION	POINT A  DO POINTS	ND COS AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

## BUILDING 7046 BN CLASSROOMS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #:** DACA 01-94-D-0033

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7046	BUILDING NAME:	BN CLASSROOMS	
	Building UA:	1,723	CONDITIONED SQFT:	3,733

SYTEMIN	FORMATION		2000
	System Type:	1	
	System Name:	Small hot water boiler	
	vstem Number	BI R-1	

Catagory Number:	Construction:	Us	e:	Occupancy HRS:	Occupancy Days
	7 BRICK AND CMU	ВА	TTALION	0700-1800	M-F; SAT
Weeks	of Winter:	32			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	18	18	18	18	18	0

<u>inputs</u>			
Motor HP:	0.08		
HP Effic:	0.64		
Load Factor:	0.80		
CFM-HTG:	0		
CFM-CLG:	0		
%OA:	0%		
%Area:	0%		
CHILLER CAP (TONS):	0		
KW-TON:	0.00		
BLR CAP INPUT (BTUH):	528,000		
BLR CAP OUTPUT (BTUH):	381,000		

	REQUIRED	PRESENT	
	HR/YR	HR/YR	
CLG HRS ON:	1,300	3,360	
HTG HRS ON:	2,080	5,376	
H/C HRS ON:	3,389	8,760	
CLG HRS SAVED:	2,060	, )	
HTG HRS SAVED:	3,296	5	
C/H HRS SAVED:	5.371		

	CONSTANTS
16.2	HOAUHC:
26.1	HOAUH:
0.000257	COAUHC:
0.00068	COAUC:
33.3	HOAOHC:
53.5	HOAOH:
0.00115	COAOHC:
0.00305	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.00021	ECC:
0.0000795	ECHC:
0.000941	NSUCHC:
0.00249	NSUCC:
0.000233	DDCCHC:
0.000616	DDCCC:
36600	NSC:
30100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7046 BUILDING NAME: BN CLASSROOMS

ENERGY CALCULATION SUMMARY

System Type:

System Name: Small hot water boiler

System Number: BLR-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	245.88	0.00	
Opt ST/SP	0.00	22.75	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	268.63	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.99	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.0
TOTAL	0.00	268.63	2.99	4.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO POINTS	T SUMM/ DI POINTS	ARY AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	O	. 0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7046	BUILDING NAME:	BN CLASSROOMS	
	Building UA:	1,723	CONDITIONED SQFT:	3,733

#### SYTEM INFORMATION.

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

# SYSTEM OPERATING SCHEDULE

Book on a company of the control of	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	18	18	18	18	18	0

Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	C

		PRESENT HR/YR
CLG HRS ON:	1,300	3,360
HTG HRS ON:	2,080	5,376
H/C HRS ON:	3,389	8,760
CLG HRS SAVED	2,060	
HTG HRS SAVED	3,296	į.
C/H HRS SAVED	5,371	_

CONSTANTS .				
HOAUHC:	16.2			
HOAUH:	. 26.1			
COAUHC:	0.000257			
COAUC:	0.00068			
HOAOHC:	33.3			
НОАОН:	53.5			
COAOHC:	0.00115			
COAOC:	0.00305			
DC DUTY:	0.17			
DC DEMAND:	0.17			
ECC:	0.00021			
ECHC:	0.0000795			
NSUCHC:	0.000941			
NSUCC:	0.00249			
DDCCHC:	0.000233			
DDCCC:	0.000616			
NSC:	36600			
DDCH:	30100			
OPT:	305			
CHWR:	17.5			
CNWR:	0			
OAR:	5.67			

LOCATION: FT. RILEY, KS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95 PREPARED BY: AJN/CWW

EMC NO: 1406-001

BUILDING NAME: BN CLASSROOMS BLDG: 7046

ENERGY CALCULATION SUMMARY

System Type: 24

Dual temperature water pump System Name:

DTWP-1 System Number:

FUNCTION:	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>N</u>	<u>lH/yr</u>
Schedule ST/SP	0.00	6,497.11	0.00	
Opt ST/SP	0.00	368.97	0.00	-
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.47	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.47	6,866.08	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	ND COST AO POINTS	DI	ARY  AI  POINTS	cost
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW	1	0	1	4	\$1,418.00
	Pump; Demand limiting - DTW					
	Pump; Night setback - DTW Pump					
	TOTAL:	1	0	1		\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7046	BUILDING NAME:	BN CLASSROOMS

Building UA: 1,723 CONDITIONED SQFT: 3,733

#### SYTEM INFORMATION

System Type: 19
System Name: Fan coil unit
System Number: FC-1

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 7 BRICK AND CMU BATTALION 0700-1800 M-F; SAT Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	18	18	18	18	18	0

: 0.	Motor HP:
: 0.	HP Effic:
: 0.	Load Factor:
: 4,4	CFM-HTG:
: 4,4	CFM-CLG:
: 0	%OA:
: 100	%Area:
•	CHILLER CAP (TONS):
: 0.	KW-TON:
	BLR CAP INPUT (BTUH):
:	BLR CAP OUTPUT (BTUH):

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,300	3,360
HTG HRS ON:	2,080	5,376
H/C HRS ON:	3,389	8,760
CLG HRS SAVED:	2,060	
HTG HRS SAVED:	3,296	
C/H HRS SAVED:	5,371	

<u>ONSTANTS</u>	
HOAUHC:	16.
HOAUH:	26.
COAUHC:	0.00025
COAUC:	0.0006
HOAOHC:	33.
HOAOH:	53
COAOHC:	0.0011
COAOC:	0.0030
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.0002
ECHC:	0.000079
NSUCHC:	0.00094
NSUCC:	0.0024
DDCCHC:	0.00023
DDCCC:	0.00061
NSC:	3660
DDCH:	3010
OPT:	30
CHWR:	17
CNWR:	
OHIVA.	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7046

BUILDING NAME: BN CLASSROOMS

#### ENERGY CALCULATION SUMMARY

System Type:

Fan coil unit System Name:

FC-1 System Number:

<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u>	<u>MH/yr</u>
0.00	901.47	0.00	
0.00	51.19	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	22,236.91	63.06	
0.00	23,189.57	63.06	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			0.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         901.47           0.00         51.19           0.00         0.00           0.00         0.00           0.00         22,236.91           0.00         23,189.57           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         901.47         0.00           0.00         51.19         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         22,236.91         63.06           0.00         23,189.57         63.06           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	ND COS AO POINTS	T SUMMA DI POINTS	ARY  AI  POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	O	1	2	\$1,213.00
	TOTAL	1	0	1	2	\$1,213.00

# BUILDING 7047 BN HQ BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95 PREPARED BY: AJN/CWW

3,733

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7047	BUILDING NAME:	BN HQ BLDG	
	Building UA:	1.723	CONDITIONED SOFT	

# SYTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days
	7 BRICK AND CMU		BATTALION	0700-1800	M-F; SAT
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

<u>NPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	528,000
BLR CAP OUTPUT (BTUH):	381,000

# HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	-
HTG HRS SAVED:	3,616	-
C/H HRS SAVED:	5,892	

<u>ONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

BLDG: 7047

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BUILDING NAME: BN HQ BLDG

#### **ENERGY CALCULATION SUMMARY**

System Type: 1
System Name: Small hot water boiler

System Number: BLR-1

<u>FUNCTION</u>	<u>kW/yr</u>	- <u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	2.99
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.0
TOTAL	0.00	0.00	2.99

	TYPICAL SYSTEN	I POINT A	ND COS	TSUMMA	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7047	BUILDING NAME:	BN HQ BLDG	
	Building UA:	1,723	CONDITIONED SQFT:	3.733

#### SYTEM INFORMATION ............

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

<u>INPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0,
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	•

<u>CONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7047 BUILDING NAME: BN HQ BLDG

				C										

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

FUNCTION -	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	2,663.96	0.00
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.92	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.92	2,801.86	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.92	2,801.86	0.00 3.00

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
	TOTAL:	1	0	1	4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7047	BUILDING N	AME: BN HQ BLDG	
Building UA:	1,723	CONDITIONED SQFT:	3,733
SYTEM INFORMATION			
System Type: 19			Andrew Constitution of the Child of Annual Constitution of the Child o

-	SYTEM INFORMATION	
	System Type:	19
	System Name:	Fan coil unit
	System Number:	FC-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	. 0	0	0
PRES STOP:	24	. 24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	18	18	18	18	18	0

Motor HP:	0.18
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	4,400
CFM-CLG:	4,400
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	C

	REQUIRED HR/YR	PRESEN HR/YR	<u> </u>
CLG HRS ON:	1,100	'	3,360
HTG HRS ON:	1,760	,	5,376
H/C HRS ON:	2,868		8,760
CLG HRS SAVED:	2,260	).	
HTG HRS SAVED:	3,616	į.	
C/H HRS SAVED:	5,892		

	<u>ONSTANTS</u>
16.2	HOAUHC:
26.1	HOAUH:
0.000257	COAUHC:
0.00068	COAUC:
33.3	HOAOHC:
53.5	НОАОН:
0.00115	COAOHC:
0.00305	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.00021	ECC:
0.0000795	ECHC:
0.000941	NSUCHC:
0.00249	NSUCC:
0.000233	DDCCHC:
0.000616	DDCCC:
36600	NSC:
30100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 **DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

LOCATION: FT. RILEY, KS

BUILDING NAME: BN HQ BLDG BLDG: 7047

**ENERGY CALCULATION SUMMARY** 

System Type:

System Name: Fan coil unit

System Number: FC-1

FUNCTION ** -	<u>kW/yr</u>	kWh/yr	<u>MBtulyr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	989.00	0.00	
Opt ST/SP	0.00	51.19	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	24,395.83	63.06	
Sub Total	0.00	25,436.02	63.06	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.0
TOTAL	0.00	25,436.02	63.06	0.0

UMCS FUNCTN NO.	TYPICAL SYSTE  UMCS APPLICATION	M POINT A  DO POINTS	ND COS AO POINTS	T SUMM/ DI POINTS	ARÝ AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0		2	\$1,213.00

# BUILDING 7048 BN HQ BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7048	BUILDING NAME:	BN HQ BLDG	
	Building UA:	1,202	CONDITIONED SQFT:	2,604

#### SYTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

<u>nputs</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	330,000
BLR CAP OUTPUT (BTUH):	257,400

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,200 3,360 HTG HRS ON: 5,376 1,920 H/C HRS ON: 3,129 8,760 CLG HRS SAVED: 2.160 HTG HRS SAVED: 3,456 C/H HRS SAVED: 5,631

CONSTANTS	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR;	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN

BLDG: 7048 BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	1.87
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.0
TOTAL	0.00	0.00	1.87 . 4.0

UMCS UNCTN NO.	UMCS APPLICATION	DO - POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7048	BUILDING NAME:	BN HQ BLDG	
	Ruilding IIA	1 202	CONDITIONED SOFT	2.60

Building UA:	1,202	!	CONDITIONED SQFT:	2,604
		·		

# SYTEM INFORMATION: System Type: 24 System Name: Dual temperature water pump System Number: DTWP-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU		BATTALION	0700-1800	M-F; SAT
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

SYSTEM OPERA	TING S	CHEDUL	E				
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

<u>INPUTS</u>	
Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0
· · · · · · · · · · · · · · · · · · ·	

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	-
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	-

<u>ONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	. 0.000257
COAUC:	0.00068
HOAOHC:	33.3
ноаон:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	17.5
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN

BLDG: 7048 BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	3,819.13	0.00
Opt ST/SP	0.00	206.85	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.38	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	1.38	4,025.98	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	. 1.38	4,025.98	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMM/ DI POINTS	ARY  AI  POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
	TOTAL:	1	0	1	4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7048	BUILDING NAME	: BN HQ BLDG	
	Building UA:	1,202	CONDITIONED SQFT:	2,604

#### SYTEM INFORMATION .....

System Type: 19
System Name: Fan coil unit

System Number: FC-1

MARCHARDURE	INGANEORMATIO	N .		
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

<u>INPUTS</u>	
Motor HP:	0.67
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	3,600
CFM-CLG:	3,600
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,200 3,360 HTG HRS ON: 1,920 5,376 8,760 H/C HRS ON: 3,129 CLG HRS SAVED: 2,160 HTG HRS SAVED: 3,456 C/H HRS SAVED: 5,631

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN

BUILDING NAME: BN HQ BLDG BLDG: 7048 

**ENERGY CALCULATION SUMMARY** 

19 System Type:

Fan coil unit System Name:

System Number: FC-1

0.00 0.00 0.00 0.00 0.00	3,518.38 190.56 0.00 0.00 19,077.03	0.00 0.00 0.00 0.00 43.99	
0.00 0.00 0.00	0.00	0.00 0.00	
0.00	0.00	0.00	
0.00			
	19,077.03	43.99	
0.00	22,785.96	43.99	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
		No.	O.
	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	A POINT A  DO POINTS	AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	O	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

# BUILDING 7050 ENLISTED BARRACKS W/AS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7050	BUILDING NAME:	ENL BARRACKS W/AS	
	D. 21.41 114			

Building UA: 7,027

CONDITIONED SQFT: 39,675

SYTEM INFORMATION ...

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

88-4 UD-1	100-96660- 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	7,330
CFM-CLG:	7,330
%OA:	20%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	-
HTG HRS SAVED	1,184	
C/H HRS SAVED:	1,929	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	- 0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	Ō
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

BUILDING NAME: ENL BARRACKS W/AS

# ENERGY CALCULATION SUMMARY

System Type: 15

7050

BLDG:

System Name: Small Single Zone air handling unit

System Number: AHU-1

FUNCTION :	kWlyr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	13,419.55	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	14.19	0.00	0.00
Night Setback	0.00	0.00	8.43
Sub Total	14.19	13,419.55	8.43
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	2,783.84	14.29
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	14.19	16,203.40	22.73 3.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95 PREPARED BY: AJN/CWW

39,675

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7050	<b>BUILDING NAME:</b>	ENL BARRACKS W/AS
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**Building UA:** 7,027 CONDITIONED SQFT:

#### SYMEMINEORMATION.

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 5 BRICK AND CMU **BARRACKS** 0000-2400 M-F; SAT-SUN Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	'SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	. 0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>inputs</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,186,000
BLR CAP OUTPUT (BTUH):	1.749.000

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	1
HTG HRS SAVED:	0	-
C/H HRS SAVED:	0	- I

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7050 BUILDING NAME: ENL BARRACKS W/AS

# ENERGY CALCULATION SUMMARY

System Type: 1
System Name: Small hot water boiler
System Number: BLR-1

FUNCTION - FUNCTION	kW/vr	<u>kWh/yr</u>	MBtulyr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	12.39
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring,		:	4
Maintenance, Run Time,			
and Safety Alarms TOTAL	0.00	0.00	12.39 4

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO	T SUMMA DI POINTS	AI	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7050	В	BUILDING NAME:	ENL BARRACKS W/AS	
Building UA:	7,0	27	CONDITIONED SQFT:	39,675
VTEN MEADUATION				
System Type	<u>.                                    </u>			
System Type:	1 Small hot water boiler	T	-	

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

SYSTEM OPERA	TING S	CHEDUL	E				
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,186,000
BLR CAP OUTPUT (BTUH):	1,749,000

	REQUIRED HR/YR	PRESENT HR/YR	
CLG HRS ON:	3,360	3,360	
HTG HRS ON:	5,376	5,376	
H/C HRS ON:	8,760	8,760	
CLG HRS SAVED:		- )	
HTG HRS SAVED:	C	j	
C/H HRS SAVED:	C	) <sup>*</sup>	

<u>NSTANTS</u>	
HOAUHC:	
HOAUH:	
COAUHC:	
COAUC:	
HOAOHC:	
HOAOH:	
COAOHC:	711-717 900 5
COAOC:	
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	
ECHC:	-
NSUCHC:	
NSUCC:	
DDCCHC:	0.000055
DDCCC:	0.00014
NSC:	2000
DDCH:	3390
OPT:	
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

4.00

4.00

PREPARED BY: AJN/CWW

BLDG: 7050 BUILDING NAME: ENL BARRACKS W/AS

#### ENERGY CALCULATION SUMMARY

System Type: 1
System Name: Small hot water boiler
System Number: BLR-2

FUNCTION -	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	12.39
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00

Remote Monitoring,
Maintenance, Run Time,
and Safety Alarms

TOTAL
0.00
12.39

TYPICAL SYSTEM POINT AND COST SUMMARY						
UMCS FUNCTN NO,	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	O	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 09-Dec-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7050 BUILDING NAME: ENL BARRACKS W/AS

Building UA: 7,027 CONDITIONED SQFT: 39,675

#### SYTEM NEORWATION

System Type: 3

System Name: Small steam boiler

System Number: BLR-3

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeke	6 Mintor:	32		

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

****	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

M - 4 11D-	0.00
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,506,000
BLR CAP OUTPUT (BTUH):	1,204,800

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	1
C/H HRS SAVED:	1,929	

	CONSTANTS
0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	нолон:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0	NSUCHC:
0	NSUCC:
0.0000556	DDCCHC:
0.000147	DDCCC:
20000	NSC:
33900	DDCH:
0	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

0.00

DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

and Safety Alarms

TOTAL

PREPARED BY: AJN/CWW

BLDG: 7050

BUILDING NAME: ENL BARRACKS W/AS ENERGY CALCULATION SUMMARY

System Type:

Small steam boiler

System Name: System Number:

BLR-3

= FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time,			4.00

UMES FUNCTO NO:		DO	AO POINTS	T SUMMA DI POINTS	RY AI POINTS	EOST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TOTA	L. 1	0	3	1	\$1,015.00

0.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7050 B	UILDING NAME: ENL BARRACKS W/AS
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Building UA: 7,027 CONDITIONED SQFT: 39,675

#### SYTEM INFORMATION:

System Type: 1

System Name: Small hot water boiler

System Number: BLR-4

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of S	Summer:	20	•	

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0.	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	0.17
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Агеа:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,200,000
BLR CAP OUTPUT (BTUH):	972,000

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	ř
HTG HRS SAVED:	0	ī k.
C/H HRS SAVED:	0	i

<u>ONSTANTS</u>	Mese description
HOAUHC:	Ċ
HOAUH:	O
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

PREPARED BY: AJN/CWW

**DATE**: 16-Sep-95

BLDG: 7050 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 11

Small hot water boiler System Name:

LOCATION: FT. RILEY, KS

System Number: BLR-4

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	7-73-V7-L
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	6.80	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	, VII II II I		:	4.00
TOTAL	0.00	0.00	6.80	4.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

LOCATION: FT. RILEY, KS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7050	BUILDING NAME:	ENL BARRACKS W/AS

BLDG: 7050 BUILDING NAME: ENL BARRACKS WAS

Building UA: 7,027 CONDITIONED SQFT:

39,675

#### SYTEM INFORMATION

System Type: 5

System Name: Steam to hot water converter

System Number: CV-1

#### TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 5 BRICK AND CMU BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

fijai bila inkii ees	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	6 5	5	5 5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

900,000

# Motor HP: 0.00 HP Effic: 0.00 Load Factor: 0.80 CFM-HTG: 0 CFM-CLG: 0 %OA: 0%

CFM-CLG:	U
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	900,000

# HOURS CALCULATIONS

BLR CAP OUTPUT (BTUH):

**INPUTS** 

		PRESENT HR/YR
CLG HRS ON	2,620	3,360
HTG HRS ON	4,192	5,376
H/C HRS ON	6,831	8,760
CLG HRS SAVED	740	<u> </u>
HTG HRS SAVED	1,184	Ī,
C/H HRS SAVED	1,929	)

#### <u>CONSTANTS</u>

0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	HOAOH:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0	NSUCHC:
0	NSUCC:
0.0000556	DDCCHC:
0.000147	DDCCC:
20000	NSC:
33900	DDCH:
0	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7050 BUILDING NAME: ENL BARRACKS W/AS

#### ENERGY CALCULATION SUMMARY

System Type: 5
System Name: Steam to hot water converter
System Number: CV-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u> <u>M</u>	<u>Btu/yr MH/</u> y	T.
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	5.10	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

0000-2400

EMC NO: 1406-001

M-F; SAT-SUN

LOCATION: FT. RILEY, KS PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7050	BUI	LDING NAME:	ENL BARRACKS W/AS	
	Building UA:	7,027		CONDITIONED SQFT:	39,675

SYTEM INFORMATION	
System Type: 24	
System Name: Dual temperature water pump	

	System No	umber: DTWP-1			
5	HEALINE TO VENE	NG INFORMATI	9 <b>)</b>	(Marine -	
	Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:

BARRACKS

Weeks of Winter:	32
Weeks of Summer:	20

5 BRICK AND CMU

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	IUE:	WED:	THUR:	FRI:	SAI:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.71
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	_ )
HTG HRS SAVED:	C	)
C/H HRS SAVED:	0	_ )

CIMAICAU	
HOAUHC:	C
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7050 BUILDING NAME: ENL BARRACKS W/AS

# ENERGY CALCULATION SUMMARY

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

<u>FUNCTION</u>	kW/yr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	3.43	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	3.43	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	3.43	0.00	0.00 3.0

UMCS FUNCTN -NO:	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMM/ DI POINTS	ARY AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	O	1	4	\$1,418.00
	TOTAL:	1	0	1	4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

39,675

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7050 BUILDING NAME: ENL BARRACKS W/A	BLDG:	7050	BUILDING NAME:	ENL BARRACKS W/AS
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DLDG.	7030	BUILDING NAME:	ENL BARRACKS WAS	
	Building UA:	7,027	CONDITIONED SQFT:	

# SYTEM INFORMATION

System Type: 24 System Name: Dual temperature water pump System Number: DTWP-2

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU		BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	f Winter:	32			
Weeks of Summer:		20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	. 0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	1

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

ENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7050 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 24
System Name: Dual temperature water pump

System Number: DTWP-2

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	3.12	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	3.12	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3
TOTAL	3.12	0.00	0.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMM/	<b>\RY</b>	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
	TOTAL:	1	0	1	4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

	BLDG:	7050	BUILDING NAME:	ENL BARRACKS W/AS	
ĺ		Building UA:	7,027	CONDITIONED SQFT:	39,675

SYT	EMINEORMATION		
	System Type:	16	
	System Name:	Heating and Ventilating Unit	
	System Number:	HV-1	

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 5 BRICK AND CMU BARRACKS 0000-2400 M-F; SAT-SUN Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,83	1 8,760
CLG HRS SAVED:	740	ō
HTG HRS SAVED:	1,184	4
C/H HRS SAVED:	1,929	- 9

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95 **PREPARED BY**: AJN/CWW

BLDG: 7050 BUILDING NAME: ENL BARRACKS W/AS

# ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit

System Number: HV-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	2,683.33	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	7.03
Sub Total	0.00	2,683.33	7.03
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	11.91
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

**DATE:** 16-Sep-95

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7050	BUILDING NAME:	ENL BARRACKS W/AS

**Building UA:** 7,027 **CONDITIONED SQFT:** 

39,675

# SYTEM INFORMATION!

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

#### PRICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 5 BRICK AND CMU BARRACKS 0000-2400 M-F; SAT-SUN Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	Ō
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	•
C/H HRS SAVED:	0	•

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7050 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 25
System Name: Hot water radiation pump

System Number: RAD-1

FUNCTION -	kW/yr	<u>kWh/yr</u>	MBtu/yr MH	<u>lyr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	0.00	3.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	<b>NRY</b>	
UMCS FUNCTN	UMCS APPLICATION	DO	AO	DI	AI	COST
NO.		POINTS	POINTS	POINTS	POINTS	
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW	1	0	1	1	\$570.00
	Pump; Night setback - HW Pump			·		
	,TOTAL:	1	0	1	1	\$570.00

# BUILDING 7053 ENLISTED BARRACKS W/AS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**DATE**: 16-Sep-95

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7053	<b>BUILDING NAME:</b>	ENL BARRACKS W/AS

Building UA: 7,027

CONDITIONED SQFT:

39,675

#### SYSTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

# YPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 5 BRICK AND CMU BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

#### 

707 17 0 2 1	• , ,
LER CAP (TONS):	0
KW-TON:	0.00
AP INPUT (BTUH): 2	186,000
OUTPUT (BTUH): 1.	749,000

#### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED	. 0	•
HTG HRS SAVED	. 0	<del>1</del> ·
C/H HRS SAVED:	. 0	
		-

<u>ITS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7053 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 1
System Name: Small hot water boiler

System Number: BLR-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
/entilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	12.39	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.0
TOTAL	0.00	0,00	12.39	4.1

	TYPICAL SYSTEM POINT AND COST SUMMARY					
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7053	BUILDING NAME:	ENL BARRACKS W/AS	
	Building UA:	7,027	CONDITIONED SQFT:	39,675

#### SYTEM INFORMATION System Type: 1 System Name: Small hot water boiler System Number: BLR-2

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days
	5 BRICK AND CMU		BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE MON: TUE: WED: THUR: FRI: SAT: SUN: 0 0 0 0 PRES START: 0 0 0 24 24 24 24 24 24 PRES STOP: 24 0 0 REQ START: 0 0 0 0 0 24 24 24 24 24 24

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,186,000
BLR CAP OUTPUT (BTUH):	1,749,000

24

REQ STOP:

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED	. 0	<u>.</u>
HTG HRS SAVED	. 0	)
C/H HRS SAVED	: O	_ )

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	Ō
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	C
CHWR:	17.5
CNWR:	C
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7053 BUILDING NAME: ENL BARRACKS W/AS

## ENERGY CALCULATION SUMMARY

System Type: Small hot water boiler System Name:

BLR-2 System Number:

- FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	12.39
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time,			4.0
and Safety Alarms TOTAL	0.00	0.00	12.39

UMCS UNCTN NO:	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	· O	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7053	BUILDING NAME:	ENL BARRACKS W/AS	
		7 007	CONDITIONED COST.	30

Building UA: 7,027

CONDITIONED SQFT: 39,675

#### SYTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-3

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 5 BRICK AND CMU BARRACKS 0000-2400 M-F; SAT-SUN Weeks of Winter: 32

## SYSTEM OPERATING SCHEDULE

Weeks of Summer:

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

20

#### INPUTS 0.50 Motor HP: 0.65 HP Effic: 0.80 Load Factor: 0 CFM-HTG: 0 CFM-CLG: 0% %OA: 0% %Area: 0 CHILLER CAP (TONS): 0.00 KW-TON: 0 **BLR CAP INPUT (BTUH):** BLR CAP OUTPUT (BTUH): 579,150

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED	. 0	)
HTG HRS SAVED	: 0	<u>.</u>
C/H HRS SAVED	C	

<u>ONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

BLDG: 7053

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

| System Type: 1 | System Name: | Small hot water boiler | System Number: | BLR-3 |

<b>FUNCTION</b>	kW/yr	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.0
TOTAL	0.00	0.00	0.00 * 4.0

UMCS UNCTN NO:	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7053	BUILDING NAME:	ENL BARRACKS W/AS
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**Building UA:** 7,027 CONDITIONED SQFT: 39,675

# SYTEM INFORMATION

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP: HP Effic: Load Factor: CFM-HTG:	
Load Factor: CFM-HTG:	2.00
CFM-HTG:	0.71
	0.80
	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	į
HTG HRS SAVED:	0	ī.
C/H HRS SAVED:	0	i

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	00000
CHWR:	17.5
CNWR:	
	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7053 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 24
System Name: Dual temperature water pump

System Number: DTWP-1

<u>FUNCTION</u>	- <u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	3.43	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	3.43	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.
TOTAL	3.43	0.00	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	ND COS AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW	1	0	1	4	\$1,418.00
	Pump; Demand limiting - DTW					
	Pump; Night setback - DTW Pump					
	TOTAL:		0	1	4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7053	BUILDING NAME:	ENL BARRACKS W/AS
	<b>D</b> '' '' 114	7.007	

**Building UA:** 7,027 CONDITIONED SQFT:

39,675

#### SYTEMINFORMATION

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-2

#### BYRICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 5 BRICK AND CMU BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	-    -
HTG HRS SAVED:	0	-  -
C/H HRS SAVED:	0	-  -  -

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7053 BUILDING NAME: ENL BARRACKS W/AS

**ENERGY CALCULATION SUMMARY** 

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-2

<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
0.00	.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
3.12	0.00	0.00
0.00	0.00	0.00
3.12	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		′
	0.00 0.00 0.00 3.12 0.00 3.12 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0	0.00         .00           0.00         0.00           0.00         0.00           3.12         0.00           0.00         0.00           3.12         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS FUNCIN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO -	ND COS AO POINTS	T SUMMA  DI POINTS	ARY AI POINTS	COST
22	Scheduled start/stop control - DTW	1	0	1	4	\$1,418.00
	Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW					
	Pump; Night setback - DTW Pump					
	TOTAL	1	<b>.</b>	1	4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7053	BUILDING NAME:	ENL BARRACKS W/AS

Building UA: 7,027 CONDITIONED SQFT: 39,675

#### SYTEM INFORMATION

System Type: 25
System Name: Hot water radiation pump
System Number: RAD-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32	•	
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

#776 7487 **********************************	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0:	0	0	0	0	0	. 0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	8%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON	3,360	3,360
HTG HRS ON	5,376	5,376
H/C HRS ON	8,760	8,760
CLG HRS SAVED	: O	-
HTG HRS SAVED	: C	
C/H HRS SAVED	: C	j

	CONSTANTS
0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	НОАОН: .
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0	NSUCHC:
O	NSUCC:
0.0000556	DDCCHC:
0.000147	DDCCC:
20000	NSC:
33900	DDCH:
	OPT:
17.5	CHWR:
	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7053 BUILDING NAME: ENL BARRACKS W/AS

ENERGY CALCULATION SUMMARY

System Type: 25
System Name: Hot water radiation pump
System Number: RAD-1

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	<u>MBtulyr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	0.00	0.00 . 3.00

UMCS FUNCTI	TYPICAL SYSTEM  UMCS APPLICATION	DO	AO	DI	AI	COST
NO.		POINTS	POINTS	POINTS	POINTS	<b>#</b> 570.00
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW	1	U	7	1	\$570.00
	Pump; Night setback - HW Pump	armon a analysis aggreens a 2	CO BARANCE WE IN JUSTICE STOLENS CONTROL SECTION			Name and the relation of the major and a more and the second
	TOTAL:	1	0	1	1	\$570.00

# BUILDING 7086 UNIT CHAPEL

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7086	<b>BUILDING NAME:</b>	UNIT CHAPEL
			O O

Building UA: 2,856 CONDITIONED SQFT:

8,696

# SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	8 BRICK AND CMU	CHURCH	0700-1800	SAT-SUN
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	0	0	0	0	0	10
REQ STOP:	14	0	0	0	0	0	13

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	5,400
CFM-CLG:	5,400
%OA:	30%
%Area:	67%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	160	3,360
HTG HRS ON:	256	5,376
H/C HRS ON:	417	8,760
CLG HRS SAVED:	3,200	
HTG HRS SAVED:	5,120	
C/H HRS SAVED:	8,343	•

<u>CONSTANTS</u>	
HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1.
НОАОН:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7086 BUILDING NAME: UNIT CHAPEL

ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit

System Number: AHU-1

FUNCTION :	<u>kW/yr</u>	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	23,584.00	227.06	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	9,100.39	195.18	
Sub Total	4.62	33,375.62	422.24	
Economizer	0.00	272.56	0.00	
Ventilation/Recirculation	0.00	170.96	8.30	
DDC Control	0.00	1,320.01	106.58	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4.62	35,139.14	537.12	* 3.00

UMCS UNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	POINT A  DO POINTS	ÁO	T SUMMA  DI  POINTS	ARY AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7086	BUI	LDING NAME:	UNIT CHAPEL	

**Building UA:** 2,856 CONDITIONED SQFT: 8,696

SYTEM INFORMATION

System Type: 1 System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	8 BRICK AND CMU	CHURCH	0700-1800	SAT-SUN
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	. 0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	9	9	9	9	9	10
REQ STOP:	14	17	17	17	17	17	13

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,308,000
BLR CAP OUTPUT (BTUH):	907,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	960	3,360
HTG HRS ON	1,536	5,376
H/C HRS ON:	2,503	8,760
CLG HRS SAVED	: 2,400	- !
HTG HRS SAVED	3,840	= !
C/H HRS SAVED	6,257	

ANTS AND THE STATE OF THE STATE	
HOAUHC:	16.8
HOAUH:	. 27
COAUHC:	0.000346
COAUC:	0.00091
HOAOHC:	71.1
HOAOH:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.0015
NSC:	102000
DDCH:	5570
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95 PREPARED BY: AJN/CWW

EMC NO: 1406-001

BUILDING NAME: UNIT CHAPEL BLDG: 7086 ENERGY CALCULATION SUMMARY

System Type:

System Name: Small hot water boiler

BLR-1 System Number:

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtulyr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	7.42
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.00
TOTAL	0.00	0.00	7.42 * 4.00

UMCS FUNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	POINT A  DO  POINTS	AO POINTS	DI	ARY AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	Ö	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

PREPARED BY: AJN/CWW

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS **ENERGY CALCULATION PARAMETERS** 

BLD	G:	70

86

BUILDING NAME: UNIT CHAPEL

**Building UA:** 

2,856

CONDITIONED SQFT:

8,696

#### SYTEM INFORMATION ...

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
8	BRICK AND CMU	CHURCH	0700-1800	SAT-SUN

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	"SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	0	0	0	0	0	10
REQ STOP:	14	0	0	0	0	0	13

0

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	20
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0

#### HOURS CALCULATIONS

BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		
HTG HRS ON:	256	5,376
H/C HRS ON:	417	8,760
CLG HRS SAVED:	3,200	- 
HTG HRS SAVED:	5,120	- 1
C/H HRS SAVED:	8,343	

# <u>CONSTANTS</u>

16.8	HOAUHC:
27	HOAUH:
0.000346	COAUHC:
0.000915	COAUC:
71.1	НОАОНС:
114	HOAOH:
0.00247	COAOHC:
0.00652	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.00032	ECC:
0.000121	ECHC:
0.000202	NSUCHC:
0.000533	NSUCC:
0.000586	DDCCHC:
0.00155	DDCCC:
102000	NSC:
55700	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7086 BUILDING NAME: UNIT CHAPEL ENERGY CALCULATION SUMMARY

System Type: 8
System Name: Air cooled DX compressor

System Number: CH-1

0.00 0.00 0.00 0.00	0.00 0.00 0.00	0.00 0.00 0.00	
0.00	0.00		
		0.00	
0.00	0.00		
	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	350.00	0.00	
0.00	0.00	0.00	
16.83	0.00	0.00	
			3.0
	0.00 0.00 0.00 0.00 0.00 0.00	0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         350.00           0.00         0.00           16.83         0.00	0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     350.00     0.00       0.00     0.00     0.00       16.83     0.00     0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINT A	AO	T SUMMA DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	<b>1</b>	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: I

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7086 E	BUILDING NAME:	UNIT CHAPEL
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Building UA: 2,856

CONDITIONED SQFT:

8,696

#### SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-2

Catagory Number:	Construction:	55000000000000000000000000000000000000	Use:	Occupancy HRS:	Occupancy Days:
oungory manipum	2 BRICK AND CMU		ADMINISTRATION	0600-1700	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	. 0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	9	9	9	9	9	10
REQ STOP:	14	17	17	17	17	17	13

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	10
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR	
CLG HRS ON:	960	3,360	
HTG HRS ON:	1,536	5,376	
H/C HRS ON:	2,503	8,760	
CLG HRS SAVED:	2,400		
HTG HRS SAVED:	3,840	* !	
C/H HRS SAVED:	6,257	-	

<u>CONSTANTS</u>	*
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67
	3.07

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95 **PREPARED BY**: AJN/CWW

BLDG: 7086 BUILDING NAME: UNIT CHAPEL

ENERGY CALCULATION SUMMARY

System Type: 8
System Name: Air cooled DX compressor

System Number: CH-2

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00:
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	175.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	8.42	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.04
TOTAL	8.42	175.00	0.00

UMCS FUNCTN NO:	TYPICAL SYSTEM UMCS APPLICATION	POINT A  DO  POINTS	AO POINTS	T SUMMA DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	roral:	1	0	Total Control	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

Building UA: 2,856 CONDITIONED SQFT: 8,696

#### SYTEM INFORMATION

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 8 BRICK AND CMU CHURCH 0700-1800 SAT-SUN Weeks of Winter: 32

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0:	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	9	9	9	9	9	10
REQ STOP:	14	17	17	17	17	17	13

Motor HP:	1.50
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	960	3,360
HTG HRS ON:	1,536	5,376
H/C HRS ON:	2,503	8,760
CLG HRS SAVED:	2,400	- !
HTG HRS SAVED:	3,840	-
C/H HRS SAVED:	6,257	

<u>ONSTANTS</u>	
HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1
нолон:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7086 BUILDING NAME: UNIT CHAPEL

ENERGY CALCULATION SUMMARY

System Type: 24

System Name: Dual temperature water pump

System Number: DTWP-1

<u>FUNCTION</u>	kWlyr	kWh/yr	MBtu/yr MI	<del>l</del> lyr
Schedule ST/SP	0.00	8,117.96	0.00	week a second as a second
Opt ST/SP	0.00	395.70	0.00	
Duty Cycle	0.00	0.00	0.00	* ***
Demand Limit	2.65	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.65	8,513.67	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	2.65	8,513.67	0.00	3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMMA DI POINTS	AI POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
	TOTAL:	1	0	1	4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95 PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7086	BUILDING NA	AME: UNIT CHAPEL	
	Building UA:	2,856	CONDITIONED SQFT:	8,696
SYTEM	INFORMATION	ALCOHOL: NO STATE OF THE STATE	and the second second	
****	System Type:	24		
	System Name:	Dual temperature water pump		
	Cy Swill Hailic.	Buar temperature mater pump		

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	BRICK AND CMU		CHURCH	0700-1800	SAT-SUN
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

## SYSTEM OPERATING SCHEDULE

	'SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	9	9	9	9	9	10
REQ STOP:	14	17	17	17	17	17	13

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	960	3,360
HTG HRS ON:	1,536	5,376
H/C HRS ON:	2,503	8,760
CLG HRS SAVED:	2,400	
HTG HRS SAVED:	3,840	
C/H HRS SAVED:	6,257	

<u>CONSTANTS</u>	
HOAUHC:	16.8
HOAUH:	27
COAUHC:	0.000346
COAUC:	0.000915
HOAOHC:	71.1
HOAOH:	114
COAOHC:	0.00247
COAOC:	0.00652
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00032
ECHC:	0.000121
NSUCHC:	0.000202
NSUCC:	0.000533
DDCCHC:	0.000586
DDCCC:	0.00155
NSC:	102000
DDCH:	55700
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BUILDING NAME: UNIT CHAPEL BLDG: 7086

**ENERGY CALCULATION SUMMARY** 

24 System Type:

Dual temperature water pump System Name:

DTWP-2 System Number:

<u>FUNCTION</u>	<u>kW/yr</u>	- <u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	4,243.48	0.00
Opt ST/SP	0.00	206.85	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.38	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	1.38	4,450.33	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	1.38	4,450.33	6.00 3.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMM/ DI POINTS	ARY  AI  POINTS	COST
22	Scheduled start/stop control - DTW Pump; Optimum start/stop - DTW Pump; Demand limiting - DTW Pump; Night setback - DTW Pump	1	0	1	4	\$1,418.00
	FOTAL:		0	1	4	\$1,418.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7086	BUILDING NAME:	UNIT CHAPEL	
	Building UA:	2,856	CONDITIONED SQFT:	8,696

SYTEM INFORMATION	
System Type:	19
System Name:	Fan coil unit
System Number:	FC-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU	ADMINISTRATION	0600-1700	M-F
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

SYSTEM OPERA	ating so	CHEDUL	E.				
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	9	9	9	9	9	10
REQ STOP:	14	17	17	17	17	17	13

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	3,300
CFM-CLG:	3,300
%OA:	20%
%Area:	33%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	960	3,360
HTG HRS ON:	1,536	5,376
H/C HRS ON:	2,503	8,760
CLG HRS SAVED:	2,400	7
HTG HRS SAVED:	3,840	į,
C/H HRS SAVED:	6,257	·

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

1.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7086 BUILDING NAME: UNIT CHAPEL

ENERGY CALCULATION SUMMARY

System Type: 19
System Name: Fan coil unit
System Number: FC-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u> :-
Schedule ST/SP	0.00	4,243.48	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	3,634.15	10.27	
Sub Total	0.00	8,084.47	10.27	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	,		·	0.00
TOTAL	0.00	8,084.47	10.27	· 0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	4	0	1	2	\$1,213.00

# BUILDING 7108 BN ADMINISTRATION& CLASSROOMS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7108 BUILDING NAME: BN ADMIN & CL
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Building UA: 2,984 CONDITIONED SQFT: 12,527

#### SYTEM INFORMATION ...

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32		
Weeks of S	Summer:	20	•	

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

	Principalising and Company of the Co
Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	7,820
CFM-CLG:	7,820
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	(
KW-TON:	0.00
BLR CAP INPUT (BTUH):	(
BLR CAP OUTPUT (BTUH):	

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,000 3,360 HTG HRS ON: 1,600 5,376 H/C HRS ON: 2,607 8,760 CLG HRS SAVED: 2,360 HTG HRS SAVED: 3,776 C/H HRS SAVED: 6,153

CONOTA		
CONSTA	THE PROPERTY OF THE PROPERTY O	
	HOAUHC:	16.2
	HOAUH:	26.1
	COAUHC:	0.000257
	COAUC:	0.00068
	HOAOHC:	33.3
	НОАОН:	53.5
	COAOHC:	0.00115
	COAOC:	0.00305
	DC DUTY:	0.17
—	DC DEMAND:	0.17
	ECC:	0.00021
	ECHC:	0.0000795
	NSUCHC:	0.000941
	NSUCC:	0.00249
	DDCCHC:	0.000233
	DDCCC:	0.000616
	NSC:	36600
	DDCH:	30100
	OPT:	305
	CHWR:	17.5
	CNWR:	0
	OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

**BUILDING NAME: BN ADMIN & CLRM** BLDG: 7108

**ENERGY CALCULATION SUMMARY** 

10 System Type:

System Name: Multizone air handling unit

AHU-1 System Number:

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MHlyr
0.00	34,377.59	77.95	
0.00	1,642.82	0.00	
0.00	0.00	0.00	
10.99	0.00	0.00	
0.00	45,276.54	109.21	
10.99	81,296.94	187.16	
0.00	1,620.83	0.00	
0.00	61.30	3.86	
0.00	4,750.37	89.82	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			5.0
	0.00 0.00 10.99 0.00 10.99 0.00 0.00 0.00 0.00 0.00	0.00         34,377.59           0.00         1,642.82           0.00         0.00           10.99         0.00           0.00         45,276.54           10.99         81,296.94           0.00         1,620.83           0.00         61.30           0.00         4,750.37           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         34,377.59         77.95           0.00         1,642.82         0.00           0.00         0.00         0.00           10.99         0.00         0.00           0.00         45,276.54         109.21           10.99         81,296.94         187.16           0.00         1,620.83         0.00           0.00         61.30         3.86           0.00         4,750.37         89.82           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMM/	<b>NRY</b>	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	atamas santabata	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	8	1	11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #**: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7108	BUILDING NAME:	BN ADMIN & CLRM	
	Building UA:	2,984	CONDITIONED SQFT:	12,527

#### SYTEM INFORMATION ---

System Type: 26
System Name: Pump
System Number: CWP-1

INCAMBULE	ING INFORMATION	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	The state of the s	
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	. 0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7:	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

## HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	- Î
HTG HRS SAVED:	3,776	ī.
C/H HRS SAVED:	6,153	-

CONSTANTS	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0002
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	(
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95 PREPARED BY: AJN/AMS

LOCATION: FT. RILEY, KS

BUILDING NAME: BN ADMIN & CLRM BLDG: 7108

ENERGY CALCULATION SUMMARY

26 System Type: System Name: Pump System Number: CWP-1

FUNCTION -	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	2,035.33	0.00.
Opt ST/SP	0.00	263.04	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.66	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.66	2,298.37	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	. ,		3.00
TOTAL	0.66	2,298.37	0.00 3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	ND COST  AO  POINTS	DI	RY AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

E	BLDG:	7108	BUILDING NAME:	BN ADMIN & CLRM	
Г		Building IIA:	2 084	CONDITIONED SOFT	12 5

Building UA: 2,984 CONDITIONED SQFT: 12,527

## SYTEM INFORMATION ....

System Type: 26
System Name: Pump
System Number: HWP-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU		BATTALION	0700-1800	M-F; SAT
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	. 0	17	17	17	17	17	0

Motor HP:	2.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED	2,360	
HTG HRS SAVED	3,776	•
C/H HRS SAVED	6,153	

ITS TO THE TOTAL T	CONSTANTS
HOAUHC: 16.2	HOA
HOAUH: 26.	но
COAUHC: 0.00025	COA
COAUC: 0.00068	CO
HOAOHC: 33.3	HOA
HOAOH: 53.9	HO
COAOHC: 0.0011	COA
COAOC: 0.0030	CO
DC DUTY: 0.1	DC D
DC DEMAND: 0.1	DC DEM
ECC: 0.0002	
ECHC: 0.000079	E
NSUCHC: 0.00094	NSU
NSUCC: 0.00249	NS
DDCCHC: 0.000233	DDC
DDCCC: 0.000616	DD
NSC: 36600	
DDCH: 30100	D
OPT: 309	
CHWR: 17.5	Cł
CNWR:	CI
OAR: 5.6	(

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS

BLDG: 7108 BUILDING NAME: BN ADMIN & CLRM

## ENERGY CALCULATION SUMMARY

System Type: 26
System Name: Pump
System Number: HWP-1

FUNCTION .	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	6,513.05	0.00
Opt ST/SP	0.00	526.08	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	7,039.14	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
and Safety Alarms	0.00	7,039.14	0.00

UMCS FUNCTA NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO	ND COS AO POINTS	DI	RY AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

# BUILDING 7109 BN ADMINISTRATION& CLASSROOMS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7109	BUILDING N	IAME: BN ADMIN & CLRM	
	Building UA:	3,224	CONDITIONED SQFT:	13,535
SYTEM	INFORMATION			4.2
	Contama Tomas 44			

SYTEM INFORMATION	
System Type:	11
System Name:	Variable Air Volume air handling unit
System Number:	AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

SYSTEM OPERA	ATING S	CHEDUI	LE				
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	. 0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	16,950
CFM-CLG:	16,950
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	(
BLR CAP OUTPUT (BTUH):	C

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	<del>-</del> )
HTG HRS SAVED:	3,456	<u>.</u>
C/H HRS SAVED:	5,631	-

HOAUHC:	16.
HOAUH:	26.
COAUHC:	0.00025
COAUC:	0.0006
HOAOHC:	33.
HOAOH:	53.
COAOHC:	0.0011
COAOC:	0.0030
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.0002
ECHC:	0.000079
NSUCHC:	0.00094
NSUCC:	0.0024
DDCCHC:	0.00023
DDCCC:	0.00061
NSC:	3660
DDCH:	3010
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS

BLDG: 7109 BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type: 11

System Name: Variable Air Volume air handling unit

System Number: AHU-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	39,170.59	0.00	
Opt ST/SP	0.00	2,121.49	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	14.19	0.00	0.00	
Night Setback	0.00	89,821.00	118.00	
Sub Total	14.19	131,113.09	118.00	
Economizer	0.00	4,215.83	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	12,355.82	97.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	14.19	147,684.74	215.04	* 5.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMM/	<b>NRY</b>	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
32	Direct digital control - VAV AHU	0	3	0	11	\$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	4	1	14	\$4,826.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7109	BUILDING NAME:	BN ADMIN & CLRM
			<b>D</b> (D C. C.L. (1).

BLDG: /109	BUILDING NAME:	BN ADMIN & CLRM

**Building UA:** 3,224 CONDITIONED SQFT:

13,535

#### SYTEM INFORMATION .....

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 7 BRICK AND CMU **BATTALION** 0700-1800 M-F; SAT

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

<u>inputs</u>	
Motor HP:	1.50
HP Effic:	0.51
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	3,437,500
BLR CAP OUTPUT (BTUH):	2,750,000

## HOURS CALCULATIONS

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	- 
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	7.
		-

<u>INSTANTS</u>	
HOAUHC:	16.
HOAUH:	26.
COAUHC:	0.00025
COAUC:	0.0006
HOAOHC:	33.
НОАОН:	53.
COAOHC:	0.0011
COAOC:	0.0030
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.0002
ECHC:	0.000079
NSUCHC:	0.00094
NSUCC:	0.0024
DDCCHC:	0.00023
DDCCC:	0.00061
NSC:	3660
DDCH:	3010
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

BLDG: 7109

BUILDING NAME: BN ADMIN & CLRM

#### **ENERGY CALCULATION SUMMARY**

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

FUNCTION:	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	6,126.33	0.00
Opt ST/SP	0.00	540.66	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	6,666.99	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	19.49
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		1	4.
TOTAL	0,00	6,666.99	19.49

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**DATE:** 16-Sep-95

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7109	BUILDING NAME	BN ADMIN & CLRM	
	Building UA:	3,224	CONDITIONED SQFT:	13,535

## SYTEM INFORMATION System Type: 6 System Name: Small air cooled chiller System Number: CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: THUR: FRI: SAT: PRES START: 0 0 0 0 0 0 0 24 24 PRES STOP: 24 24 24 24 24 **REQ START:** 0 0 6 6 6 6 0 0 **REQ STOP:** 18 18 18 18 18

Motor HP:	2.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	80
KW-TON:	1.10
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,36
HTG HRS ON:	1,920	5,37
H/C HRS ON:	3,129	8,76
CLG HRS SAVED:	2,160	<del>.</del> i
HTG HRS SAVED	3,456	1
C/H HRS SAVED:	5,631	-

	<u> UNSTANTS</u>
16	HOAUHC:
26	HOAUH:
0.00025	COAUHC:
0.0006	COAUC:
33	HOAOHC:
53	НОАОН:
0.0011	COAOHC:
0.0030	COAOC:
0.1	DC DUTY:
0.1	DC DEMAND:
0.0002	ECC:
0.000079	ECHC:
0.00094	NSUCHC:
0.0024	NSUCC:
0.00023	DDCCHC:
0.00061	DDCCC:
3660	NSC:
3010	DDCH:
30	OPT:
17	CHWR:
	CNWR:
5.6	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS

BLDG: 7109 BUILDING NAME: BN ADMIN & CLRM
ENERGY CALCULATION SUMMARY

System Type: 6
System Name: Small air cooled chiller

System Number: CH-1

FUNCTION	kWlvr -	<u>kWh/yr</u>	MBtulyr MHyr
Schedule ST/SP	0.00	3,754.63	0.00
Opt ST/SP	0.00	530.17	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.33	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	1.33	4,284.79	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	1,400.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	67.32	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.0
TOTAL	68.65	5,684.79	0.00 4.

UMCS FUNCTN	TYPICAL SYSTEM  UMCS APPLICATION				ĀĪ	COST
NO.		POINTS	POINTS	POINTS	POINTS	
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
	TOTAL:	2	0	3	2	\$1,481.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7109	BUILDING NAME:	BN ADMIN & CLRM	
	Building UA:	3,224	CONDITIONED SQFT:	13,535
				0000A.2.0000000

#### SYTEM INFORMATION System Type: 26

System Name: Pump

System Number: CWP-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days
	7 BRICK AND CMU		BATTALION	0700-1800	M-F; SAT
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0:	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0.	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	<del></del> )
HTG HRS SAVED:	3,456	- i
C/H HRS SAVED:	5,631	-

	/
CONSTANTS	
HOAUHC:	16.2
HOAUH:	26.
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7109 BUILDING NAME: BN ADMIN & CLRM

			G									

 System Type:
 26

 System Name:
 Pump

 System Number:
 CWP-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	11,634.37	0.00
Opt ST/SP	0.00	1,642.82	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	4.12	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	4.12	13,277.18	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	4.12	13,277.18	2 0.00 3.00

UMCS FUNCTN NO.	TYPICAL SYSTEN  UMCS APPLICATION	POINT A  DO POINTS	AO	DI	RY  AI  POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS

3,535

## **ENERGY CALCULATION PARAMETERS**

BLDG.	7109	BOILDING NAME.	DIA ADMIN & CERM	
BLDG:	7109	BUILDING NAME.	BN ADMIN & CLRM	

Building UA:	3,224	CONDITIONED SQFT:	13

#### SYTEM INFORMATION System Type: 26 System Name: Pump System Number: CWP-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: THUR: FRI: SAT: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 **REQ START:** 0 6 6 6 6 6 0 0 **REQ STOP:** 18 18 18 18

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	C
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	С
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	C

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	
HTG HRS SAVED:	3,456	•
C/H HRS SAVED:	5,631	

<u>CONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7109 BUILDING NAME: BN ADMIN & CLRM

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	E	N	E	к	U	1	23	23	u	А	98	1	. 1	3	u	m	Ш	1	A	15	*	į

 System Type:
 26

 System Name:
 Pump

 System Number:
 CWP-2

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	11,634.37	0.00
Opt ST/SP	0.00	1,642.82	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	4.12	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	4.12	13,277.18	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	4.12	13,277.18	0,00

	TYPICAL SYSTEM	A POINT A	ND COS	T SUMMA	\RY	
UMCS FUNCTI NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7109	BUIL	DING NAME:	BN ADMIN & CLRM	
	Building UA:	3,224		CONDITIONED SQFT:	13,535

## SYTEM INFORMATION

System Type: 26	:
System Name: Pump	
System Number: HWP-1	

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
7	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of V	Vinter:	32		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	18	18	18	18	18	0

2.00
0.69
0.80
0
0
0%
0%
0
0.00
0
0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	<u>.</u>
HTG HRS SAVED:	3,456	5
C/H HRS SAVED:	5,631	-

<u>CONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/AMS

BLDG: 7109 BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

 System Type:
 26

 System Name:
 Pump

 System Number:
 HWP-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	5,961.10	0.00
Opt ST/SP	0.00	526.08	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	6,487.18	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.00	6,487.18	0.00 3.0

UMCS FUNCTI NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	AND COS AO POINTS	DI	RY AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

# BUILDING 7176 MOTOR POOL MAINTENANCE SHOP

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

EMC NO: 1406-001

4,880

**DATE**: 09-Dec-95

PREPARED BY: CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7176	BUILDING NAME:	MOTOR POOL MNT SHOP

CONDITIONED SQFT: 2,032 **Building UA:** 

#### SYTEM INFORMATION "

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

#### TYPICAL BUILDING INFORMATION Occupancy HRS: Occupancy Days: Construction: Catagory Number: M-F 0700-1800 13 METAL PANEL AND CMU VEH MAINT SHOP

Weeks of Winter: 32 20 Weeks of Summer:

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	. 0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	8	9	12	9	0
REQ STOP:	0	17.	17	17	15	17	0

NPUTS	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Агеа:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,250,000
BLR CAP OUTPUT (BTUH):	1,000,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	720	3,360
HTG HRS ON:	1,152	5,376
H/C HRS ON:	1,877	8,760
CLG HRS SAVED:	2,640	-
HTG HRS SAVED:	4,224	Ţ.
C/H HRS SAVED:	6,883	<b>i</b>

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
ноаон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0.
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 09-Dec-95

PREPARED BY: CWW

BLDG: 7176 BUILDING NAME: MOTOR POOL MNT SHOP

ENERGY CALCULATION SUMMARY

System Type: 3
System Name: Small steam boiler
System Number: BLR-1

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0.00	4.00

UMCS FUNCTI NO.		<b>DO</b>	AO POINTS	DI .	RY AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
4	TOTAL	£ 1 ,	Ô	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7176	BUILDING NAME:	: MOTOR POOL MNT SHOP

**Building UA:** 2,032 CONDITIONED SQFT: 4,880

#### SYTEM INFORMATION

System Type: 21

System Name: HW Unit heater

System Number: UH-1

#### TYPICAL BUILDING INFORMATION

13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F	Catagory Number: Construction:	Use:	Occupancy HRS:	Occupancy Days:
		VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32 Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	8	9	12	9	. 0
REQ STOP:	0	17	17	17	15	17	. 0

## INPLITS

<u> Nalais</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	8,250
CFM-CLG:	0
%OA:	0%
%Area:	22%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

## HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	720	3,360
HTG HRS ON:	1,152	5,376
H/C HRS ON:	1,877	8,760
CLG HRS SAVED:	2,640	
HTG HRS SAVED:	4,224	1
C/H HRS SAVED:	6,883	

#### CONSTANTS

0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	НОАОН:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0.000105	NSUCHC:
0.000278	NSUCC:
0.000161	DDCCHC:
0.000426	DDCCC:
94300	NSC:
40600	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: CWW

BLDG: 7176

BUILDING NAME: MOTOR POOL MNT SHOP

ENERGY CALCULATION SUMMARY

System Type: 2

System Name: HW Unit heater

System Number: UH-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,909.76	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	42.16	
Sub Total	0.00	2,047.66	42.16	
Economizer	0.00	0.00	0.00	
/entilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00

UMCS FUNCTN NO	TYPICAL SYSTEN  UMCS APPLICATION	POINT A  DO  POINTS	AO POINTS	T SUMM/ DI POINTS	ΔĪ	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

# BUILDING 7178 MOTOR POOL ADMINISTRATION

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7178	BILL DING NAME	MOTOR POOL ADMIN
DLDG.	1110	DUILDING NAME.	INIO I OK POOL ADMIN

DLDG.	1110	DOILDING NAME.	MOTOR FOOL ADMIN	
	Building UA:	645	CONDITIONED SQFT:	2,480

#### SYTEMINFORMATION

System Type: 21
System Name: HW Unit heater
System Number: UH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU	ADMINISTRATION	0600-1700	M-F
Weeks of	Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	'SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	8	9	12	9	0
REQ STOP:	0	17	17	17	15	17	0

<u>INPUTS</u>	
Motor HP:	0.08
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	600
CFM-CLG:	0
%OA:	0%
%Area:	50%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 720 3,360 HTG HRS ON: 1,152 5,376. H/C HRS ON: 1,877 8,760 CLG HRS SAVED: 2,640 HTG HRS SAVED: 4,224 C/H HRS SAVED: 6,883

UND I AN I D	nekn d <b>a</b> latik.
HOAUHC:	C
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: AJN/CWW

**DATE:** 16-Sep-95

BUILDING NAME: MOTOR POOL ADMIN

ENERGY CALCULATION SUMMARY

System Type: 21
System Name: HW Unit heater

BLDG: 7178

System Number: UH-1

FUNCTION .	kW/yr	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	315.11	0.00	
Opt ST/SP	0.00	22.75	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	3.52	
Sub Total	0.00	337.86	3.52	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				0.00
Maintenance, Run Time, and Safety Alarms		:		,
TOTAL	0.00	337.86	3.52	* 0.00

UMCS FUNCTN	TYPICAL SYSTEN  UMCS APPLICATION	DO ·	AO	DI	ΑΙ	COST
<b>NO.</b>	Scheduled start/stop control -	POINTS	POINTS	POINTS 1	POINTS 2	\$1,213.00
	Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip					
	TOTAL:	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

#### PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG: 7178	BUILDING NAME:	MOTOR POOL ADMIN	
Building UA:	645	CONDITIONED SQFT:	2,480

# SYTEM INFORMATION

System Type: 21
System Name: HW Unit heater
System Number: UH-2

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU		ADMINISTRATION	0600-1700	M-F
Weeks o	f Winter:	32	•		
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	. 0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	8	9	12	9	0
REQ STOP:	0	17	17	17	15	17	0

54 - 4 - 11B	0.00
Motor HP:	0.08
HP Effic:	0.64
oad Factor:	0.80
CFM-HTG:	600
CFM-CLG:	0
%OA:	0%
%Area:	50%
CAP (TONS):	0
KW-TON:	0.00
PUT (BTUH):	0
PUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 720 3,360 HTG HRS ON: 5,376 1,152 H/C HRS ON: 1,877 8,760 CLG HRS SAVED: 2,640 HTG HRS SAVED: 4,224 C/H HRS SAVED: 6,883

<u>ONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
НОАОНС:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7178 BUILDING NAME: MOTOR POOL ADMIN

ENERGY CALCULATION SUMMARY

System Type: 21
System Name: HW Unit heater
System Number: UH-2

<b>FUNCTION</b>	kW/yr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	315.11	0.00
Opt ST/SP	0.00	22.75	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	3.52
Sub Total	0.00	337.86	3.52
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			0.0
TOTAL	0.00	337.86	3.52 , 0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AND COST AO POINTS	DI	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	4	0	1	2	\$1,213.00

# BUILDING 7212 CO HQ BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7212	BUILDING NAME	: CO HQ BLDG	
	Building UA:	7,306	CONDITIONED SQFT:	19,320

## SYTEM INFORMATION

21 LEM MALOVINA 1907	
System Type:	26
System Name:	Pump
System Number:	CWP-1

Catagony Number	ING INFORMATIO		Use:	Occupancy HRS:	Occupancy Days:
Catagory Number:	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

## SYSTEM OPERATING SCHEDULE

2,444,000	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	19	19	19	19	19	0

A4 - 4 11D.	3.00
Motor HP:	3.00
HP Effic:	0:79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	C

## HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	1,300	3,360
HTG HRS ON:	2,080	5,376
H/C HRS ON:	3,389	8,760
CLG HRS SAVED	2,060	)
HTG HRS SAVED	3,296	5
C/H HRS SAVED	5,371	Ī

HOAUHC:	0
HOAUH:	
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG:	7212	BUILDING NAME: CO	HQ BLDG

## ENERGY CALCULATION SUMMARY

System Type:	26	
System Name:	Pump	
System Number:	CWP-1	

<b>FUNCTION</b>	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	4,668.64	0.00
Opt ST/SP	0.00	691.23	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.73	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	1.73	5,359.87	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	1.73	5,359.87	0.00 . 3.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	DI	RY AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7212	BUILDING NAME:	CO HQ BLDG	
	Building UA:	7,306	CONDITIONED SQFT:	19,320

# System Type: 19 System Name: Fan coil unit System Number: FC-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks of	Winter:	32			
Weeks of S		20			

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: THUR: FRI: SAT: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 \_\_\_6 **REQ START:** 0 6 6 6 6 0 REQ STOP: 0 19 19 19 19 19

1.00	Motor HP:
0.69	HP Effic:
0.80	Load Factor:
7,200	CFM-HTG:
7,200	CFM-CLG:
20%	%OA:
37%	%Area:
(	CHILLER CAP (TONS):
0.00	KW-TON:
(	BLR CAP INPUT (BTUH):
(	BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,300	3,360
HTG HRS ON:	2,080	5,376
H/C HRS ON:	3,389	8,760
CLG HRS SAVED:	2,060	-
HTG HRS SAVED:	3,296	
C/H HRS SAVED:	5,371	-

	<u>CONSTANTS</u>
0	HOAUHC:
Ö	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	HOAOH:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0.000226	NSUCHC:
0.000598	NSUCC:
0.0000188	DDCCHC:
0.0000498	DDCCC:
93100	NSC:
29900	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BUILDING NAME: CO HQ BLDG BLDG: 7212 

**ENERGY CALCULATION SUMMARY** 

System Type: Fan coil unit System Name: FC-1 System Number:

FUNCTION	kW/vr	<u>kWh/yr</u>	<u>MBtu/yr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	4,631.85	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	8,739.23	251.67	
Sub Total	0.00	13,634.12	251.67	
Economizer	0.00	0.00	0.00	
/entilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:	251.67	0.0

UMCS FUNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	POINT A  DO  POINTS	AO POINTS	T SUMMA DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG: 7212 BUILDING NAME: CO HQ BLDG
--------------------------------------

Building UA: 7,306 CONDITIONED SQFT: 19,320

## SYTEM INFORMATION ...

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

#### SYSTEM OPERATING SCHEDULE

	√SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	19	19	19	19	19	0

0

#### **INPUTS** Motor HP: 0.50 HP Effic: 0.66 Load Factor: 0.80 CFM-HTG: 2,400 CFM-CLG: 0 %OA: 100% %Area: 16% CHILLER CAP (TONS): 0 KW-TON: 0.00 **BLR CAP INPUT (BTUH):** 0

## HOURS CALCULATIONS

BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,300	3,360
HTG HRS ON:	2,080	5,376
H/C HRS ON:	3,389	8,760
CLG HRS SAVED:	2,060	-    -
HTG HRS SAVED:	3,296	1
C/H HRS SAVED:	5,371	-

<u>NSTANTS</u>	
HOAUHC:	C
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7212

BUILDING NAME: CO HQ BLDG

## ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-1

FUNCTION	kW/yr	kWh/yr	MBtulyr -	<u>MH/yr</u>
Schedule ST/SP	0.00	1,490.19	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	107.47	
Sub Total	0.00	1,628.09	107.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	34.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,628.09	141.98	3.00

UMCS UNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	ARY AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

EMC NO: 1406-001

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7212	BUILDING NAME:	CO HQ BLDG	
	Building UA:	7,306	CONDITIONED SQFT:	19,320

## SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-2

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	9	7	7	7	7	7	10
REQ STOP:	13	21	21	21	21	21	19

<u>INPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,660	3,360
HTG HRS ON:	2,656	5,376
H/C HRS ON:	4,328	8,760
CLG HRS SAVED:	1,700	-
HTG HRS SAVED:	2,720	Ī
C/H HRS SAVED:	4,432	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7212

BUILDING NAME: CO HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	1,229.77	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	107.47	
Sub Total	0.00	1,367.67	107.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	34.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.
TOTAL	0.00	1,367.67	141.98	3.

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG: 7212 BUILDING NAME: CO HQ BLDG

**Building UA:** 7,306 CONDITIONED SQFT:

19,320

SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-3

TYPICAL BUILD	ING INFORMATIO	N			
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks of	f Winter:	32			
Weeks of S	ummer:	20			

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	19	19	19	19	19	0

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,300	3,360
HTG HRS ON:	2,080	5,376
H/C HRS ON:	3,389	8,760
CLG HRS SAVED:	2,060	•
HTG HRS SAVED:	3,296	
C/H HRS SAVED:	5,371	!

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: AJN/CWW

**DATE**: 16-Sep-95

BUILDING NAME: CO HQ BLDG

**ENERGY CALCULATION SUMMARY** 

System Type: 16

BLDG: 7212

System Name: Heating and Ventilating Unit

System Number: HV-3

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,490.19	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	107.47	
Sub Total	0.00	1,628.09	107.47	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	34.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	0.00	1,628.09	141.98	3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7212	BUILDING NAME:	CO HO BLDG
DLDG.	1212	DUILDING NAME.	

**Building UA:** 7,306 CONDITIONED SQFT:

19,320

# SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-4

TYPICAL BUILDING INFORMATION								
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:				
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F				
Weeks o	f Winter:	32						
Weeks of S	Summer:	20						

# SYSTEM OPERATING SCHEDULE

	√SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	19	19	19	19	19	0

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,300	3,360
HTG HRS ON:	2,080	5,376
H/C HRS ON:	3,389	8,760
CLG HRS SAVED:	2,060	)
HTG HRS SAVED:	3,296	-  -
C/H HRS SAVED:	5,371	-

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BUILDING NAME: CO HQ BLDG

**ENERGY CALCULATION SUMMARY** 

System Type: 16

BLDG: 7212

System Name: Heating and Ventilating Unit

System Number: HV-4

		AND THE PROPERTY OF THE PROPER	MH/yr
0.00	1,490.19	0.00	
0.00	137.90	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	107.47	
0.00	1,628.09	107.47	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	34.52	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         137.90           0.00         0.00           0.00         0.00           0.00         0.00           0.00         1,628.09           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         137.90         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         107.47           0.00         1,628.09         107.47           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         34.52           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS UNCTN NO:	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: '

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

EMC NO: 1406-001

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7212	BUILDING NAME:	CO HQ BLDG
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Building UA: 7,306 CONDITIONED SQFT: 19,320

# SYTEM INFORMATION

System Type: 26
System Name: Pump
System Number: HWP-1

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 3 BRICK AND CMU ADMIN & SUPPLY 0700-1600 M-F Weeks of Winter: 32 Weeks of Summer: 20

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	19	19	19	19	19	0

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,300	3,360
HTG HRS ON:	2,080	5,376
H/C HRS ON:	3,389	8,760
CLG HRS SAVED:	2,060	<u>-</u> )
HTG HRS SAVED	3,296	<b>5</b> .
C/H HRS SAVED:	5,371	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

System Number:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

HWP-1

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16

**EMC NO**: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7212	BUILDIN	IG NAME:	CO HQ BLDG
	* FNERGY CAL	CULAT	ION SUMMARY
		A (1) (1) (1) (1)	
System Type:	26		i

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u> -
Schedule ST/SP	0.00	12,053.02	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	13,168.36	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00

	TYPICAL SYSTE	M POINT A	ND COS	TSUMMA	RY	
UMCS						
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
	Scheduled start/stop control - Pump; Optimum start/stop - Pump	1	0	1	0	\$386.00
	Demand limiting - Pump	,				
	Demand limiting - Pump  TOTAL:		0		0	\$38

# BUILDING 7215 BN HQ BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: ajn/cww

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7215	BUILDING NAME:	BN HQ BLDG
	Building UA:	1,202	CONDITIONED SQFT:

Building UA:

2,604

# SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

TYPICAL BUILD	ING INFORMATIO	N			
Catagory Number:	Construction:	V	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU		BATTALION	0700-1800	M-F; SAT
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	3,250
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED	2,260	- 
HTG HRS SAVED:	3,616	-
C/H HRS SAVED:	5,892	

<u>CONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: ajn/cww

BLDG: 7215

BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

15 System Type:

System Name: Small Single Zone air handling unit

System Number: AHU-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr MH/yr	
Schedule ST/SP	0.00	1,949.09	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.66	0.00	0.00	
Night Setback	0.00	18,289.05	0.00	
Sub Total	0.66	20,501.18	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	2,202.20	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	0.66	22,703.38	0.00	3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO TOINTS	AO POINTS	DI	ARY AI POINTS	COST
	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: ajn/cww

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7215	BUILDING NAME:	BN HQ BLDG	
	Building UA:	1,202	CONDITIONED SQFT:	2,604

SYTEM NEORMATION	- Daily
System Type:	1
System Name:	Small hot water boiler
System Number:	BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

# SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED:

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	258,000
BLR CAP OUTPUT (BTUH):	206,400

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	 <b>)</b>
HTG HRS SAVED:	3,616	•
C/H HRS SAVED:	5,892	 !

<u>CONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
нолон:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: ajn/cww

BLDG: 7215 BUILDING NAME: BN HQ BLDG

# **ENERGY CALCULATION SUMMARY**

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	1.46	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	1.46	4.0

	TYPICAL SYSTEM	POINT A	IND COS	TSUMM	ARY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: ajn/cww

# **ENERGY CALCULATION PARAMETERS**

Building UA: 1,202 CONDITIONED SQFT: 2,604

# SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

# TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	BRICK AND CMU	BATTALION	0700-1800	M-F; SAT

Weeks of Winter: 32
Weeks of Summer: 20

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

# Motor HP: 0.00

0.00
0.64
0.80
0
0
0%
0%
8
1.10
0
0

# HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	•
C/H HRS SAVED:	5,892	-

### CONSTANTS

HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: ajn/cww

BLDG: 7215 BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

<u>FUNCTION</u>	<u>kWlyr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	140.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	6.73	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	I POINT A  DO POINTS	AO	T SUMM/ DI POINTS	ARY AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: ajn/cww

LOCATION: FT. RILEY, KS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7215	BUILDING NAME:	BN HQ BLDG

**Building UA:** 1,202 CONDITIONED SQFT: 2,604

# SYTEM INFORMATION

System Type: 25 System Name: Hot water radiation pump System Number: RAD-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU		BATTALION	0700-1800	M-F; SAT
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	. 0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	. 0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.08
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

<u>CONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67
<b>47.1.1.</b>	0.07

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: ajn/cww

BLDG: 7215 BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	269.75	0.00
Opt ST/SP	0.00	22.75	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	292.51	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.00	292.51	0.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	\RY	
UMCS FUNCTN	UMCS APPLICATION	DO	AO	DI	AI	COST
NO.		POINTS	POINTS	POINTS	POINTS	
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW	1	0	1	1	\$570.00
Ear Mark	Pump; Night setback - HW Pump	K <del>ranani</del>				
	TOTAL:	1	0	1	1	\$570.00

# BUILDING 7218 BN HQ BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS/DEJ

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7218	BUILDING NAME:	BN HQ BLDG

**Building UA:** 3,007

CONDITIONED SQFT:

12,625

# SYTEM INFORMATION:

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

<u>INPUTS</u>	
Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	7,820
CFM-CLG:	7,820
%OA:	15%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	- 
HTG HRS SAVED:	3,936	<del></del>   
C/H HRS SAVED:	6,414	-

CONSTANTS	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/DEJ

BLDG: 7218

BUILDING NAME: BN HQ BLDG

# ENERGY CALCULATION SUMMARY

System Type: 10 System Name: Mul

Multizone air handling unit

System Number: AHU-1

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
0.00	36,478.74	121.87	
0.00	1,642.82	0.00	
0.00	0.00	0.00	
10.99	0.00	0.00	
0.00	47,195.03	110.06	
10.99	85,316.59	231.93	
0.00	1,458.75	0.00	
0.00	91.95	5.80	
0.00	4,275.33	90.51	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			5.0
	0.00 0.00 10.99 0.00 10.99 0.00 0.00 0.0	0.00         36,478.74           0.00         1,642.82           0.00         0.00           10.99         0.00           0.00         47,195.03           10.99         85,316.59           0.00         1,458.75           0.00         91.95           0.00         4,275.33           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         1,642.82         0.00           0.00         0.00         0.00           10.99         0.00         0.00           0.00         47,195.03         110.06           10.99         85,316.59         231.93           0.00         1,458.75         0.00           0.00         91.95         5.80           0.00         4,275.33         90.51           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	IRY :	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	8	1	11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/DEJ

**DATE:** 16-Sep-95

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7218	BUILDING NAME:	BN HQ BLDG

**Building UA:** 3,007 CONDITIONED SQFT:

12,625

SYTEM INFORMATION ......

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	· 0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	. 0

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	525,000
BLR CAP OUTPUT (BTUH):	420,000

# HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	Ī
HTG HRS SAVED:	3,936	7
C/H HRS SAVED:	6,414	•

<u>CONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/DEJ

BLDG: 7218

BUILDING NAME: BN HQ BLDG

# **ENERGY CALCULATION SUMMARY**

System Type:

System Name: Small hot water boiler

BLR-1 System Number:

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	3,559.10	0.00
Opt ST/SP	0.00	275.79	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	3,834.89	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	2.98
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.0
TOTAL	0.00	3,834.89	2.98

UMCS TUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO POINTS	T SUMMA  DI POINTS	ARY AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/DEJ

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7218	BUILDING NAME	: BN HQ BLDG	
	Building UA:	3,007	CONDITIONED SQFT:	12,625

# SYTEM INFORMATION

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of	Winter:	32		
Weeks of S	Summer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	,
HTG HRS SAVED:	3,936	•
C/H HRS SAVED:	6,414	•

<u>CONSTANTS</u>	1827 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
ноаон:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/AMS/DEJ

BLDG: 7218 BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

<u>FUNCTION</u>	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	2,121.57	0.00
Opt ST/SP	0.00	263.04	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.66	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.66	2,384.61	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	525.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	25.25	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	The state of the s		4.0
TOTAL	25.90	2,909.61	0.00 , 4.0

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

# BUILDING 7220 CO HQ BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: DJ/AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7220	BUILDING N	AME: CO HQ BLDG	
	Building UA:	4,949	CONDITIONED SQFT:	18,870
SYTEM	<u> INFORMATION</u>			

System Type: 1 System Name: Small hot water boiler System Number: BLR-1

Catagory Number:	Construction:	and the second second	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,327,500
BLR CAP OUTPUT (BTUH):	1,062,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	•
HTG HRS SAVED:	3,456	-
C/H HRS SAVED:	5,631	-

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	- 0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: DJ/AJN

**DATE:** 16-Sep-95

BLDG: 7220 BUILDING NAME: CO HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

<u>FUNCTION</u> -	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	12,638.12	0.00
Opt ST/SP	0.00	1,115.34	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	13,753.46	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	7.53
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			<b>4</b> .0

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: DJ/AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7220 BUILDING NAME: CO HQ
---------------------------------

**Building UA:** 4,949

CONDITIONED SQFT:

18,870

# SYTEM INFORMATION ::

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

# SYSTEM OPERATING SCHEDULE

Weeks of Summer:

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

20

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	65
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

REQUIRED HR/YR	PRESENT HR/YR
1,200	3,360
1,920	5,376
3,129	8,760
2,160	•
3,456	•
5,631	<del>.</del> :
	HR/YR : 1,200 : 1,920 : 3,129 : 2,160 : 3,456

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: DJ/AJN

BLDG: 7220 BUILDING NAME: CO HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	4,895.27	0.00
0.00	691.23	0.00
0.00	0.00	0.00
1.73	0.00	0.00
0.00	0.00	0.00
1.73	5,586.50	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	1,137.50	0.00
0.00	0.00	0.00
54.70	0.00	0.00
		4
	0.00 0.00 1.73 0.00 1.73 0.00 0.00 0.00 0.00 0.00 0.00	0.00         691.23           0.00         0.00           1.73         0.00           0.00         0.00           1.73         5,586.50           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         1,137.50           0.00         0.00

	TYPICAL SYSTEM POINT AND COST SUMMARY							
UMCS FUNCTN NO:	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST		
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00		
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00		
16	Alarms - Chiller	0	0	2	0	\$281.00		
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00		
	TOTAL:	2	0	3	2	\$1,481.00		

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: DJ/AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7220 BUIL	DING NAME: CO HQ BLDG	
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Building UA: 4,949 CONDITIONED SQFT: 18,870

# SYTEM INFORMATION \*\*\*

System Type: 19
System Name: Fan coil unit
System Number: FC-1

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 3 BRICK AND CMU ADMIN & SUPPLY 0700-1600 M-F

Weeks of Winter: 32
Weeks of Summer: 20

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

### **INPUTS** Motor HP: 1.00 HP Effic: 0.69 Load Factor: 0.80 CFM-HTG: 7,200 CFM-CLG: 7,200 %OA: 20% %Area: 37% CHILLER CAP (TONS): 0 KW-TON: 0.00 BLR CAP INPUT (BTUH): 0 **BLR CAP OUTPUT (BTUH):** 0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	m.
HTG HRS SAVED:	3,456	
C/H HRS SAVED:	5,631	-

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0,17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: DJ/AJN

BUILDING NAME: CO HQ BLDG BLDG: 7220 ENERGY CALCULATION SUMMARY System Type: Fan coil unit System Name: System Number: FC-1

FUNCTION :	kW/yr	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	4,856.70	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	9,163.46	170.48	
Sub Total	0.00	14,283.20	170.48	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	14,283.20	170.48	1 0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMMA  DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: DJ/AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7220	BUILDING NAME:	CO HQ BLDG	
	Building UA:	4,949	CONDITIONED SQFT:	18,870

# SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

<u>inputs</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	_ )
HTG HRS SAVED:	3,456	; }
C/H HRS SAVED:	5,631	-

HOAUHC:	
	(
HOAUH:	C
COAUHC:	·
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: DJ/AJN

LOCATION: FT. RILEY, KS

BLDG: 7220 BUILDING NAME: CO HQ BLDG

**ENERGY CALCULATION SUMMARY** 

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	1,562.53	0.00	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	72.80	
Sub Total	0.00	1,700.43	72.80	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	23.38	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

18,870

PREPARED BY: DJ/AJN

# **ENERGY CALCULATION PARAMETERS**

BUILDING NAME: CO HQ BEDG	BLDG:	7220	BUILDING NAME:	CO HQ BLDG
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BOILDING NAME. CO TO BLUG

Building UA: 4,949 CONDITIONED SQFT:

# SYTEM INFORMATION ...

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-2

# TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter: 32
Weeks of Summer: 20

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

# INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

REQUIRED HR/YR	PRESENT HR/YR
1,200	3,360
1,920	5,376
3,129	8,760
2,160	<u>.</u> I
3,456	-
5,631	

### CONSTANTS

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: DJ/AJN

BLDG: 7220 BUILDING NAME: CO HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-2

1,562.53 137.90 0.00 0.00 0.00 1,700.43 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 72.80 72.80 0.00 0.00 23.38
0.00 0.00 0.00 1,700.43 0.00 0.00	0.00 0.00 72.80 72.80 0.00 0.00 23.38
0.00 0.00 1,700.43 0.00 0.00	0.00 72.80 <b>72.80</b> 0.00 0.00 23.38
0.00 1,700.43 0.00 0.00 0.00	72.80 72.80 0.00 0.00 23.38
1,700.43 0.00 0.00 0.00	72.80 0.00 0.00 23.38
0.00 0.00 0.00	0.00 0.00 23.38
0.00	0.00 23.38
0.00	23.38
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
0.00	0.00
i	3.00
: : !	96.18 . 3.00
_	0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: DJ/AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7220	<b>BUILDING NAME:</b>	CO HQ BLDG

Building UA: 4,949 CONDITIONED SQFT: 18,870

### SYTEM INFORMATION ...

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-3

# TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

# | Motor HP: 0.50 | HP Effic: 0.66 | Load Factor: 0.80 | CFM-HTG: 2,400 | CFM-CLG: 0

2,400	CFM-HTG:
0	CFM-CLG:
100%	%OA:
16%	%Area:
0	CHILLER CAP (TONS):
0.00	KW-TON:
0	BLR CAP INPUT (BTUH):
0	BLR CAP OUTPUT (BTUH):

# **HOURS CALCULATIONS**

REQUIRED HR/YR	PRESENT HR/YR
1,200	3,360
1,920	5,376
3,129	8,760
2,160	
3,456	•
5,631	
	1,200 1,920 3,129 2,160 3,456

### HOAUH: 0 COAUHC: 0 COAUC: 0 HOAOHC: 0 0 HOAOH: COAOHC: 0 COAOC: 0 DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0 ECHC: 0 **NSUCHC:** 0.000226 NSUCC: 0.000598 DDCCHC: 0.0000188 DDCCC: 0.0000498 NSC: 93100

DDCH:

CHWR:

CNWR:

OAR:

OPT:

HOAUHC:

0

29900

305

17.5

5.67

0

CONSTANTS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: DJ/AJN

BLDG: 7220

BUILDING NAME: CO HQ BLDG

ENERGY CALCULATION SUMMARY

16 System Type:

Heating and Ventilating Unit System Name:

System Number: HV-3

FUNCTION :	kWlyr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	1,562.53	0.00
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	72.80
Sub Total	0.00	1,700.43	72.80
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	23.38
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: DJ/AJN

LOCATION: FT. RILEY, KS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7220	BUILDING NAME:	CO HQ BLDG

Building UA: 4,949 CONDITIONED SQFT: 18,870

# SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-4

# TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 3 BRICK AND CMU ADMIN & SUPPLY 0700-1600 M-F

Weeks of Winter: 32
Weeks of Summer: 20

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17.	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

### REQUIRED PRESENT HR/YR CLG HRS ON: 1,200 3,360 HTG HRS ON: 1,920 5,376 H/C HRS ON: 3,129 8,760 CLG HRS SAVED: 2,160 HTG HRS SAVED: 3,456

5,631

HOURS CALCULATIONS

C/H HRS SAVED:

<u>CONSTANTS</u>	*
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: DJ/AJN

BLDG: 7220

BUILDING NAME: CO HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: Heating and Ventilating Unit System Name:

HV-4 System Number:

<u>FUNCTION</u>	<u>kW/yr</u>	- <u>kWh/yr</u>	MBtu/yr	MHAyr
Schedule ST/SP	0.00	1,562.53	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	72.80	
Sub Total	0.00	1,700.43	72.80	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	23.38	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	0.00	1,700.43	96.18	3.0

	TYPICAL SYSTEM POINT AND COST SUMMARY					
UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: DJ/AJN

### **ENERGY CALCULATION PARAMETERS**

BLDG:	7220	• .	<b>BUILDING NAME:</b>	CO HQ BLDG

**Building UA:** 4,949 CONDITIONED SQFT:

18,870

#### SYTEM INFORMATION ....

System Type: 26 System Name: Pump

System Number: HWP-1

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 3 BRICK AND CMU **ADMIN & SUPPLY** 0700-1600 M-F Weeks of Winter: 32

Weeks of Summer: 20

	√SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	. 0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.72
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		<del></del>
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	I
HTG HRS SAVED:	3,456	<del>1</del>
C/H HRS SAVED:	5,631	7.

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: DJ/AJN

BLDG: 7220	BUILDING NAME:	CO HQ BLDG
EN.	IERGY CALCULAT	ION SUMM

 System Type:
 26

 System Name:
 Pump

 System Number:
 HWP-1

FUNCTION -	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	8,654.02	0.00
Opt ST/SP	0.00	763.74	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	9,417.75	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.00	9,417.75	0.00 3.0

	TYPICAL SYSTEN	I POINT A	ND COS	TSUMMA	RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	O	1	0	\$386.00
	TOTAL:		. 0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #:** DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: DJ/AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7220	BUILDING NAME:	CO HQ BLDG	
	Building UA:	4,949	CONDITIONED SQFT:	18,870
SYTEM	INFORMATION		**************************************	

SYTEM INFORMATION	
System Type:	26
System Name:	Pump
System Number:	HWP-1

Catagory Number:	Construction:	1	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	. 0	0	0	0	0	0	. 0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	17	17	17	17	17	. 0

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,200	3,360
HTG HRS ON:	1,920	5,376
H/C HRS ON:	3,129	8,760
CLG HRS SAVED:	2,160	, )
HTG HRS SAVED:	3,456	5,
C/H HRS SAVED:	5,631	-

COAUHC: 0 COAUC: 0 HOAOHC: 0 HOAOHC: 0 HOAOHC: 0 COAOC: 0 COAOC: 0 COAOC: 0 DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0 ECHC: 0 NSUCHC: 0.000226 NSUCC: 0.000598 DDCCHC: 0.0000188 DDCCHC: 0.0000188 DDCCC: 0.0000498 NSC: 93100 DDCH: 29900	<u>CONSTANTS</u>	•
COAUHC: 0 COAUC: 0 HOAOHC: 0 HOAOHC: 0 HOAOHC: 0 COAOC: 0 COAOC: 0 COAOC: 0 DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0 ECHC: 0 NSUCHC: 0.000226 NSUCC: 0.000598 DDCCHC: 0.0000188 DDCCHC: 0.0000498 NSC: 93100 DDCH: 29900 OPT: 305	HOAUHC:	0
COAUC: 0 HOAOHC: 0 HOAOHC: 0 HOAOHC: 0 COAOC: 0 COAOC: 0 DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0 ECHC: 0 NSUCHC: 0.000226 NSUCC: 0.000598 DDCCHC: 0.0000188 DDCCC: 0.0000498 NSC: 93100 DDCH: 29900	HOAUH:	0
HOAOHC: 0 HOAOH: 0 COAOHC: 0 COAOC: 0 DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0 ECHC: 0 NSUCHC: 0.000226 NSUCC: 0.000598 DDCCHC: 0.0000188 DDCCC: 0.0000498 NSC: 93100 DDCH: 29900	COAUHC:	0
HOAOH: 0 COAOHC: 0 COAOC: 0 DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0 ECHC: 0 NSUCHC: 0.000226 NSUCC: 0.000598 DDCCHC: 0.0000188 DDCCC: 0.0000498 NSC: 93100 DDCH: 29900 OPT: 305	COAUC:	0
COAOHC: 0 COAOC: 0 COAOC: 0 DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0 ECHC: 0 NSUCHC: 0.000226 NSUCC: 0.000598 DDCCHC: 0.0000188 DDCCC: 0.0000498 NSC: 93100 DDCH: 29900 OPT: 305	HOAOHC:	0
COAOC: 0 DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0 ECHC: 0 NSUCHC: 0.000226 NSUCC: 0.000598 DDCCHC: 0.0000188 DDCCC: 0.0000498 NSC: 93100 DDCH: 29900 OPT: 305	HOAOH:	0
DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0 ECHC: 0 NSUCHC: 0.000226 NSUCC: 0.000598 DDCCHC: 0.0000498 DDCCC: 0.000498 NSC: 93100 DDCH: 29900 OPT: 305	COAOHC:	0
DC DEMAND:         0.17           ECC:         0           ECHC:         0           NSUCHC:         0.000226           NSUCC:         0.000598           DDCCHC:         0.0000188           DDCCC:         0.0000498           NSC:         93100           DDCH:         29900           OPT:         305	COAOC:	0
ECC: 0 ECHC: 0 NSUCHC: 0.000226 NSUCC: 0.000598 DDCCHC: 0.0000188 DDCCC: 0.0000498 NSC: 93100 DDCH: 29900 OPT: 305	DC DUTY:	0.17
ECHC: 0  NSUCHC: 0.000226  NSUCC: 0.000598  DDCCHC: 0.0000188  DDCCC: 0.0000498  NSC: 93100  DDCH: 29900  OPT: 305	DC DEMAND:	0.17
NSUCHC: 0.000226  NSUCC: 0.000598  DDCCHC: 0.0000188  DDCCC: 0.0000498  NSC: 93100  DDCH: 29900  OPT: 305	ECC:	0
NSUCC:         0.000598           DDCCHC:         0.0000188           DDCCC:         0.0000498           NSC:         93100           DDCH:         29900           OPT:         305	ECHC:	0
DDCCHC:         0.0000188           DDCCC:         0.0000498           NSC:         93100           DDCH:         29900           OPT:         305	NSUCHC:	0.000226
DDCCC: 0.0000498  NSC: 93100  DDCH: 29900  OPT: 305	NSUCC:	0.000598
NSC:         93100           DDCH:         29900           OPT:         305	DDCCHC:	0.0000188
DDCH: 29900 OPT: 305	DDCCC:	0.0000498
<b>OPT</b> : 305	NSC:	93100
	DDCH:	29900
CHWR: 17.5	OPT:	305
<b></b>	CHWR:	17.5
CNWR: 0	CNWR:	0
OAR: 5.67	OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: DJ/AJN

BLDG: 7220

BUILDING NAME: CO HQ BLDG
ENERGY CALCULATION SUMMARY

ENERGY CALCULATION SUMMARY

 System Type:
 26

 System Name:
 Pump

 System Number:
 HWP-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u> .	MBtu/yr MH/yr
Schedule ST/SP	0.00	7,832.43	0.00
Opt ST/SP	0.00	691.23	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	8,523.66	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		;	3.0
TOTAL	0.00	8,523.66	0.00 3.0

UMCS FUNCTI NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO	AO	T SUMM/ DI POINTS	ARY AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

# BUILDING 7243 ADMINISTRATION & SUPPLY BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7243 BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA: 4,676 CONDITIONED SQFT: 17,829

SYTEM INFORMATION TO BE A STATE OF THE STATE

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter: 32
Weeks of Summer: 20

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Агеа:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,063,000
BLR CAP OUTPUT (BTUH):	850,000

HOUR	S CA	LCI	JLAT	<b>TIONS</b>
Marin/L/Young	MARKE SA	1800 G. 1822	War Carry	WWW.C.CONTO

		PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

<u>CONSTANTS</u>	
HOAUHC:	· 0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7243 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 1
System Name: | Small hot water boiler

System Number: BLR-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	3,414.42	0.00
Opt ST/SP	0.00	275.79	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	3,690.21	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	6.03
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	AO	T SUMMA DI POINTS	ARY AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	. 0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7243 BUILDING	NAME: ADMIN & SUPPORT BLDG
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**Building UA:** 4,676 CONDITIONED SQFT:

17,829

#### SYTEMINEORNATION ....

System Type: 26 System Name: Pump

System Number: CWP-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	. 0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	. 7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	- !
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	-

<u>CONSTANTS</u>	*
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95 **PREPARED BY**: AJN/CWW

BLDG: 7243 BUILDING NAME: ADMIN & SUPPORT BLDG

THE RESERVE OF THE PARTY OF THE	and contract of the contract o		
			SUMMARY
CONCRETE MAN TO F A SECOND THE TAX ASSESSMENT OF	and the second s	ACCOUNT OF PARTY WAS A WAY	
SEC. 10. 10. 10. 10. 10. 10. 10. 10. 10. 10	CONTRACTOR OF CO	MARK ■ TASK SEE 5 DOOR 5 . ' WAS	

 System Type:
 26

 System Name:
 Pump

 System Number:
 CWP-1

<u>FUNCTION</u>	kW/yr	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	1,067.01	0.00
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.35	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.35	1,204.90	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.35	1,204.90	0.00 3.00

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	<b>NRY</b>	
UMCS FUNCTN	UMCS APPLICATION	DO	AO	DI	Al	COST
NO.		POINTS	POINTS	POINTS	POINTS	
24	Scheduled start/stop control -	1	0	1	0	\$386.00
	Pump; Optimum start/stop - Pump;					
	Demand limiting - Pump					

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

17,829

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7243	<b>BUILDING NAME:</b>	ADMIN & SUPPORT BLDG
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Building UA: 4,676 CONDITIONED SQFT:

#### SYSTEM INFORMATION :

System Type: 23
System Name: Ventilation fan
System Number: EF-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32	•		
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	. 0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7		7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	2.00
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	14,975
%OA:	100%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,000 3,360 HTG HRS ON: 1,600 5,376 H/C HRS ON: 2,607 8,760 CLG HRS SAVED: 2,360 HTG HRS SAVED: 3,776

6,153

C/H HRS SAVED:

0
0
0
0
0
0
0
0
0.17
0.17
0
0
00226
00598
00188
00498
3100
29900
305
17.5
0
5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7243 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 23

System Name: Ventilation fan

System Number: EF-1

E: FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	13,944.40	0.00
Opt ST/SP	0.00	691.23	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	14,635.63	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	733.99	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring,			3.0
Maintenance, Run Time, and Safety Alarms		į	
TOTAL	0.00	15,369.62	0.00 , 3.0

21 Scheduled start/stop control - 1 0 0  Ventilation Fan; Optimum  start/stop - Ventilation Fan; Night setback - Ventilation Fan	2	\$532.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

17,829

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7	7243	BUILDING NAME:	ADMIN & SUPPORT BLDG
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But III

Building UA: 4,676 CONDITIONED SQFT:

SYTEM INFORMATION:

System Type: 19
System Name: Fan coil unit
System Number: FC-1

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 3 BRICK AND CMU ADMIN & SUPPLY 0700-1600 M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	. 0

<u>inputs</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	1,800
%OA:	0%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	_ )
HTG HRS SAVED:	3,776	,
C/H HRS SAVED:	6,153	Š

CONSTANTS	
HOAUHC:	C
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7243 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 19
System Name: Fan coil unit
System Number: FC-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	5,306.39	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	2,502.98	30.47	
Sub Total	0.00	8,072.42	30.47	
Economizer	0.00	0.00	0.00	
/entilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.0 •

UMCS FUNCTN NO.	TYPICAL SYSTEN  UMCS APPLICATION	POINT A  DO  POINTS	AO	T SUMMA DI POINTS	ARÝ AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0		2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

### **ENERGY CALCULATION PARAMETERS**

BLDG: 7243 BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA: 4,676 CONDITIONED SQFT: 17,829

SYTEM INFORMATION :

System Type: 16

System Name: Heating and Ventilating Unit

System Number: H&V-1

TYPICAL BUILDING INFORMATION

 Catagory Number:
 Construction:
 Use:
 Occupancy HRS:
 Occupancy Days:

 3BRICK AND CMU
 ADMIN & SUPPLY
 0700-1600
 M-F

Weeks of Winter: 32
Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

THUR: FRI: SAT: MON: TUE: SUN: WED: 0 0 0 0 PRES START: 0 24 24 24 24 24 24 24 PRES STOP: 7 0 **REQ START:** 0 17 17 17 0 17 **REQ STOP:** 0 17

**INPUTS** 0.33 Motor HP: 0.65 **HP Effic:** 0.80 Load Factor: 2,000 CFM-HTG: CFM-CLG: 0 100% %OA: 13% %Area: 0 CHILLER CAP (TONS): 0.00 KW-TON: 0 **BLR CAP INPUT (BTUH):** BLR CAP OUTPUT (BTUH): 0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	);
HTG HRS SAVED	3,776	<u>;</u>
C/H HRS SAVED:	6,153	5

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0.
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7243 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit
System Number: H&V-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	1,144.09	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	56.59	
Sub Total	0.00	1,236.51	56.59	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	18.18	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	0.00	1,236.51	74.77	3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARE

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7243	BUILDING NAME:	ADMIN & SUPPORT BLDG

Building UA: 4,676

CONDITIONED SQFT:

17,829

#### SYTEM INFORMATION

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>PUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	78%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR 3,360 CLG HRS ON: 1,000 1,600 5,376 HTG HRS ON: 8,760 H/C HRS ON: 2,607 2,360 CLG HRS SAVED: 3,776 HTG HRS SAVED: C/H HRS SAVED: 6,153

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
НОАОНС:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7243 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

<u>kW/yr</u>	kWh/yr	<u>MBtu/yr</u> <u>MH/yr</u>
0.00	1,707.21	0.00
0.00	137.90	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	1,845.11	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		3.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         1,707.21           0.00         137.90           0.00         0.00           0.00         0.00           0.00         0.00           0.00         1,845.11           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

	TYPICAL SYSTEM	A POINT A	ND COS	T SUMM/	ARY :	
UMCS	UMCS APPLICATION	рO	AO	DI	ΑĪ	COST
NO.		POINTS		POINTS	POINTS	
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
	TOTAL.	1	0	1	1	\$570.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

LOCATION: FT. RILEY, KS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7243	BUILDING N	NAME: ADMIN & SUPPORT BLDG	
Building UA:	4,676	CONDITIONED SQFT:	17,829
SYTEM INFORMATION			

SYTEM INFORMATION	<b>是在这种国际</b> 的是一个人,但是一个人的
System Type:	21
System Name:	HW Unit heater
System Number:	UH-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
ES START:	0	0	0	0	0	0	0
ES STOP:	24	24	24	24	24	24	24
START:	0	7	7	7	7	7.	0
STOP:	. 0	17.	17	17	17	17	0

Motor HP:	0.04
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	220
CFM-CLG:	0
%OA:	0%
%Area:	2%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	:
C/H HRS SAVED:	6,153	<b>1</b> :

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7243 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 21

System Name: HW Unit heater

System Number: UH-1

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtulyr MH/yr
Schedule ST/SP	0.00	140.84	0.00
Opt ST/SP	0.00	11.38	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	8.71
Sub Total	0.00	152.22	8.71
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring,			0.0
Maintenance, Run Time, and Safety Alarms			/
TOTAL	0.00	152.22	8.71

UMCS FUNCTN	TYPICAL SYSTEM  UMCS APPLICATION	DO .	AO	DI	ARY AI POINTS	COST
NO.		POINTS	POINTS	POINTS	FUNIS	
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback -	1	0	1	2	\$1,213.00
	Unitary Equip					
	TOTAL:		0	1	2	\$1,213.00

# BUILDING 7245 ENLISTED PERSONNEL DINING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

PREPARED BY: CWW/AJN

LOCATION: FT. RILEY, KS

# **ENERGY CALCULATION PARAMETERS**

Building UA: 2,545 CONDITIONED SQFT: 13,998

# SYTEM INFORMATION

System Type: 11

System Name: Variable Air Volume air handling unit

System Number: AHU-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1	1 BRICK AND CMU		MESS HALL - DINING AREA	√0600-2000	M-F; SAT-SUN
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

#### SYSTEM OPERATING SCHEDULE

	√SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	O	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,000
CFM-CLG:	7,000
%OA:	30%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### **HOURS CALCULATIONS**

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1.929	1

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.0017
DC DUTY:	0.17
DC DEMAND:	0.1
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.00026
NSUCC:	0.00069
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	5720
DDCH:	22500
OPT:	30
CHWR:	17.9
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: CWW/AJN

BLDG: 7245 BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type: 11

System Name: Variable Air Volume air handling unit

System Number: AHU-1

'kW/yr	kWh/yr	MBtu/yr N	<del>lH/yr</del>
0.00	9,579.22	115.06	
0.00	1,115.34	0.00	
0.00	0.00	0.00	
7.46	0.00	0.00	
0.00	3,524.80	50.95	
7.46	14,219.37	166.01	
0.00	3,767.82	0.00	
0.00	399.03	18.19	
0.00	8,606.70	20.04	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			5
		204.25	. 5
	0.00 0.00 0.00 7.46 0.00 7.46 0.00 0.00 0.00 0.00	0.00         9,579.22           0.00         1,115.34           0.00         0.00           7.46         0.00           0.00         3,524.80           7.46         14,219.37           0.00         3,767.82           0.00         399.03           0.00         8,606.70           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         9,579.22         115.06           0.00         1,115.34         0.00           0.00         0.00         0.00           7.46         0.00         0.00           0.00         3,524.80         50.95           7.46         14,219.37         166.01           0.00         3,767.82         0.00           0.00         399.03         18.19           0.00         8,606.70         20.04           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO:	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	AO	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	Ö	1	\$348.00
32	Direct digital control - VAV AHU	0	3	0	11	\$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
40	Maintenance (filter) alarm - AHU  TOTAL:	1	4	1	4	\$4

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95 PREPARED BY: CWW/AJN

EMC NO: 1406-001

**ENERGY CALCULATION PARAMETERS** 

BLDG: 7245 BUILDING NAME: ENL PERS
------------------------------------

**Building UA:** 2,545

CONDITIONED SQFT:

13,998

#### SYTEM INFORMATION

System Type: 11

System Name: Variable Air Volume air handling unit

System Number: AHU-2

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 11 BRICK AND CMU MESS HALL - DINING AREA 0600-2000 M-F; SAT-SUN

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,250
CFM-CLG:	7,250
%QA:	30%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	•

<u>ONSTANTS</u>	35.4FKG.######
HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
НОАОН:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: CWW/AJN

BLDG: 7245 BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type: 11
System Name: Variable Air Volume air handling unit

System Number: AHU-2

FUNCTION -	<u>kW/yr</u>	- <u>kWh/yr</u> -	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,669.36	119.17	The beginning the house of the
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	3,650.69	50.95	
Sub Total	7.46	14,435.40	170.12	
Economizer	0.00	3,902.39	0.00	
Ventilation/Recirculation	0.00	413.28	18.84	
DDC Control	0.00	8,914.08	20.04	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.0
TOTAL	7.46	27,665.15	209.00	5.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
32	Direct digital control - VAV AHU	0	3	0	11	\$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**DATE**: 09-Dec-95

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

PREPARED BY: CWW/AJN

LOCATION: FT. RILEY, KS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7245	BUILDING NAME:	ENL PERS DIN	

Building UA: 2,545 CONDITIONED SQFT:

13,998

#### BYTEM INFORMATION = ..

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU		MESS HALL - KITC	HEN ARE 0500-2400	M-F; SAT-SUN
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

NPUTS :	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	66%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	7,071,000
BLR CAP OUTPUT (BTUH):	5,657,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	]
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
ноаон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: CWW/AJN

BLDG: 7245

BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type:

Small steam boiler System Name:

System Number: BLR-1

FUNCTION .	- kW/yr	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				4.00
Maintenance, Run Time, and Safety Alarms			i	
TOTAL	0.00	0.00	0.00	4.00

E.		YPICAL SY:	STEM POINT A	ND COST	SUMMA	RY	
UMCS							COST
FUNCTN NO.	UMCS.	APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
	1						
7	Steam Boiler M	fonitoring	1	0	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: CWW/AJN LOCATION: FT. RILEY, KS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7245	BUILDING NAME	: ENL PERS DIN	
	Building UA:	2,545	CONDITIONED SQFT:	13,998

SYTEM INFORMATION System Type: 5 System Name: Steam to hot water converter System Number: CV-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days
	2 BRICK AND CMU		MESS HALL - KIT	CHEN ARE 0500-2400	M-F; SAT-SUN
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

STATE OF THE PARTY	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

<u>NPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	66%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,000,000
BLR CAP OUTPUT (BTUH):	2,000,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	- )
HTG HRS SAVED:	1,184	- !
C/H HRS SAVED:	1,929	-  -

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: CWW/AJN

BLDG: 7245 BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type: 5

System Name: Steam to hot water converter

System Number: CV-1

0.00 0.00 0.00 0.00 0.00 0.00 0.00	.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00	
0.00 0.00 0.00 <b>0.00</b> 0.00	0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00	
0.00 0.00 <b>0.00</b> 0.00	0.00 0.00 <b>0.00</b> 0.00	0.00° 0.00 <b>0.00</b> 0.00	
0.00 <b>0.00</b> 0.00	0.00 <b>0.00</b> 0.00	0.00 <b>0.00</b> 0.00	
<b>0.00</b> 0.00	<b>0.00</b> 0.00	<b>0.00</b> 0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	11.34	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.
	0.00 0.00 0.00	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00     0.00     11.34       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO	T SUMMA DI POINTS	ARY AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00
	TOTAL:	1	1	1	<b>3</b>	\$1,495.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

System Number: CWP-1

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: CWW/AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7245	BUILDING NA	AME: ENL PERS DIN	
	Building UA:	2,545	CONDITIONED SQFT:	13,998
SYTEM	INFORMATION:	and Distance America		E production and the second
	System Type: 26	A CONTRACTOR OF	Section and Commence of the section and the section of the section	n page country many from agreement the character and the state of the character and
	System Name: Pump			

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
1	1 BRICK AND CMU	MESS HALL - DIN	IING AREA 0600-2000	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

SYSTEM OPERA	TING S	CHEDUL	£				
Maria di de la designa de la designa de la designa de la decensión de la decen	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24.	24	24	24	24
REQ START:	0	5	5	5	5	5	0
REQ STOP:	0	20	20	20	20	20	0

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	(
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	(
KW-TON:	1.10
BLR CAP INPUT (BTUH):	(
BLR CAP OUTPUT (BTUH):	(

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,500	3,360
HTG HRS ON:	2,400	5,376
H/C HRS ON:	3,911	8,760
CLG HRS SAVED:	1,860	- 
HTG HRS SAVED:	2,976	-
C/H HRS SAVED:	4,849	1

	<u>CONSTANTS</u>
28.4	HOAUHC:
45.6	HOAUH:
0.000623	COAUHC:
0.00165	COAUC:
33.9	HOAOHC:
54.4	НОАОН:
0.0006483	COAOHC:
0.00171	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000208	ECC:
0.0000788	ECHC:
0.000261	NSUCHC:
0.000691	NSUCC:
0.00018	DDCCHC:
0.000476	DDCCC:
57200	NSC:
22500	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: CWW/AJN

BLDG: 7245

BUILDING NAME: ENL PERS DIN

**ENERGY CALCULATION SUMMARY** 

System Type:

26

System Name:

Pump

System Number:

CWP-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	6,801.76	0.00
Opt ST/SP	0.00	1,115.34	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	2.80	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	2.80	7,917.11	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	RY	
UMCS FUNCTN	UMCS APPLICATION	DO	AO	DI	AT	COST
NO.		POINTS			POINTS	
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: CWW/AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7245	BUILDING NAME:	ENL PERS DIN	
	Building UA:	2,545	CONDITIONED SQFT:	13,998
SYTEM	INFORMATION	a produce a company of the Cold	· · · · · · · · · · · · · · · · · · ·	

MAION TO THE PARTY OF THE PARTY System Type: 17 System Name: Heating and Ventilating Unit with Return Fa System Number: HRU-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1	2 BRICK AND CMU		MESS HALL - KIT	CHEN ARE 0500-2400	M-F; SAT-SUN
Weeks of	Winter:	32		•	
Weeks of S	ummer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	8.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	11,400
CFM-CLG:	0
%OA:	100%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	<u> </u>
HTG HRS SAVED:	1,184	ļ
C/H HRS SAVED:	1,929	)

	<u>CONSTANTS</u>
0	HOAUHC:
- 0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	НОАОН:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0	NSUCHC:
0	NSUCC:
0.00000209	DDCCHC:
0.00000552	DDCCC:
992000	NSC:
9640	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: CWW/AJN

BLDG: 7245 BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type: 17

System Name: Heating and Ventilating Unit with Return Fa

System Number: HRU-1

kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr	
0.00	6,927.56	0.00	
0.00	1,784.55	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	151.48	
0.00	8,712.11	151.48	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	1.47	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			4.
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         6,927.56           0.00         1,784.55           0.00         0.00           0.00         0.00           0.00         0.00           0.00         8,712.11           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00       6,927.56       0.00         0.00       1,784.55       0.00         0.00       0.00       0.00         0.00       0.00       0.00         0.00       0.00       151.48         0.00       8,712.11       151.48         0.00       0.00       0.00         0.00       0.00       0.00         0.00       0.00       1.47         0.00       0.00       0.00         0.00       0.00       0.00         0.00       0.00       0.00         0.00       0.00       0.00         0.00       0.00       0.00

TYPICAL SYSTEM POINT AND COST SUMMARY						
UMCS TUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	O	2	\$697.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS PREPARE

PREPARED BY: CWW/AJN

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7245	BUILDING NAME:	ENL PERS DIN	
	Building UA:	2 545	CONDITIONED SOFT:	13 998

# SYTEM INFORMATION

System Type: 17

System Name: Heating and Ventilating Unit with Return Fa

System Number: HRU-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1:	BRICK AND CMU	MESS HALL - KI	TCHEN ARE 0500-2400	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

	'SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	
HTG HRS SAVED:	1,184	7.
C/H HRS SAVED:	1,929	1

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: CWW/AJN

BLDG: 7245 BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type: 17
System Name: Heating and Ventilating Unit with Return Fa
System Number: HRU-2

FUNCTION	<u>kWlyr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	4,472.22	0.00
Opt ST/SP	0.00	1,152.05	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	75.74
Sub Total	0.00	5,624.27	75.74
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.74
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.00

TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	<b>ARY</b>	
UMCS APPLICATION	DO POINTS	ÃO POINTS	DI POINTS	AI POINTS	COST
w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/	2	0	O	2	\$697.00
Direct digital control - H&V Unit	0	1	0	3	\$813.00
•	0	1	0	0	\$272.00
		UMCS APPLICATION POINTS  Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF Direct digital control - H&V Unit  Outside air damper ventilation and  0	UMCS APPLICATION POINTS  Scheduled start/stop control - AHU W/ RF; Optimum start/stop - AHU W/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF Direct digital control - H&V Unit Outside air damper ventilation and  DO AO POINTS  2 0 1 0 1	UMCS APPLICATION POINTS  Scheduled start/stop control - AHU W/ RF; Optimum start/stop - AHU W/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF  Direct digital control - H&V Unit Outside air damper ventilation and  Diagonal AG POINTS  0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Scheduled start/stop control - AHU 2 0 0 2 w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF Direct digital control - H&V Unit 0 1 0 3 Outside air damper ventilation and 0 1 0 0

# **BUILDING 7264 LIBRARY MAIN**

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

LOCATION: FT. RILEY, KS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7264	BUILDING NAME:	LIBRARY MAIN	
BLDG:	7264	BUILDING NAME:	LIBRARY MAIN	

Building UA: 4,363 CONDITIONED SQFT: 31,240

# SYTEM INFORMATION .....

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

TYPICALSUIEDI	NG INFORMATIO			
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
21	BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32		
Weeks of Su	ımmer	20		

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	13	0	11	0	11	9	9
REQ STOP:	17	0	19	0	19	17	17

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,200
CFM-CLG:	7,200
%OA:	20%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	720	3,360
HTG HRS ON:	1,152	5,376
H/C HRS ON:	1,877	8,760
CLG HRS SAVED:	2,640	
HTG HRS SAVED:	4,224	
C/H HRS SAVED:	6,883	

<u>ONSTANTS</u>	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
, HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67
	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7264 BUILDING NAME: LIBRARY MAIN

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	25,169.66	209.13	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	10,952.00	22.62	
Sub Total	7.46	37,237.01	231.75	
Economizer	0.00	1,059.61	0.00	
Ventilation/Recirculation	0.00	0.00	9.27	
DDC Control	0.00	1,242.07	23.66	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				, 3.C
Maintenance, Run Time,		: *		
and Safety Alarms	7.46	39.538.69	264.68	3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

LOCATION: FT. RILEY, KS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7264 BUILDING NAME: LIBRARY MA	3LDG:
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Building UA: 4,363 CONDITIONED SQFT: 31,240

### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

### TYPICAL BUILDING INFORMATION

 Catagory Number:
 Construction:
 Use:
 Occupancy HRS:
 Occupancy Days:

 21 BRICK AND CMU
 TRAINING
 0700-2100
 M-F

Weeks of Winter: 32
Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	13	0	11	0	11	9	9
REQ STOP:	17	0	19	0	19	17	17

0

0

<u>inputs</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	7,200
CFM-CLG:	7.200

CFM-HTG: 7,200
CFM-CLG: 7,200
%OA: 20%
%Area: 17%
CHILLER CAP (TONS): 0
KW-TON: 0.00

BLR CAP INPUT (BTUH): BLR CAP OUTPUT (BTUH):

### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	720	3,360
HTG HRS ON:	1,152	5,376
H/C HRS ON:	1,877	8,760
CLG HRS SAVED:	2,640	
HTG HRS SAVED:	4,224	•
C/H HRS SAVED:	6,883	•

# CONSTANTS

46 7 N. 1 0 0 0 0 1 7 1 1 1 1 1 1 1 1 1 1 1 1 1	
HOAUHC:	
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
НОАОН:	
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7264 BUILDING NAME: LIBRARY MAIN

ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit

System Number: AHU-2

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	25,169.66	209.13	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	10,952.00	22.62	
Sub Total	7.46	37,237.01	231.75	
Economizer	0.00	1,059.61	0.00	
Ventilation/Recirculation	0.00	0.00	9.27	
DDC Control	0.00	1,242.07	23.66	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			264.68	3.00

IMCS INCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

LOCATION: FT. RILEY, KS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7264	BUILDING NAME:	LIBRARY MAIN	
	Building UA:	4,363	CONDITIONED SQFT:	31,240

### SYTEM INFORMATION .....

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-3

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	1 BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	. 0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	11	7	7	7	7	7	11
REQ STOP:	22	22	22	22	22	22	22

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	6,916
CFM-CLG:	6,916
%OA:	20%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	1,940	3,360
HTG HRS ON	3,104	5,376
H/C HRS ON	5,058	8,760
CLG HRS SAVED	1,420	•
HTG HRS SAVED	2,272	•
C/H HRS SAVED:	3,702	•

	<u>NSTANTS</u>
2	HOAUHC:
	HOAUH:
	COAUHC:
	COAUC:
1	HOAOHC:
	НОАОН:
0.000	COAOHC:
0.00	COAOC:
C	DC DUTY:
0	DC DEMAND:
0.000	ECC:
0.0000	ECHC:
0.000	NSUCHC:
0.000	NSUCC:
0.0000	DDCCHC:
0.000	DDCCC:
30	NSC:
31:	DDCH:
	OPT:
1	CHWR:
	CNWR:
5	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7264 BUILDING NAME: LIBRARY MAIN

**ENERGY CALCULATION SUMMARY** 

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

FUNCTION	<u>kW/yr</u>	kWb/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	13,538.23	108.05	4.000
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	5,658.49	22.62	
Sub Total	7.46	20,312.06	130.67	
Economizer	0.00	2,742.44	0.00	
Ventilation/Recirculation	0.00	0.00	8.90	
DDC Control	0.00	3,214.67	23.66	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	7.46	26,269.18	163.23	» 3.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7264	BUILDING NAME:	LIBRARY MAIN
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Building UA: 4,363 CONDITIONED SQFT: 31,240

# SYTEM INFORMATION CARE

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	21 BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	13	0	11	0	11	9	9
REQ STOP:	17	0	19	0	19	17	17

<u>INPUTS</u>	
Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	13,650
CFM-CLG:	13,650
%OA:	15%
%Area:	41%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		PRESENT HR/YR
CLG HRS ON:	720	3,360
HTG HRS ON:	1,152	5,376
H/C HRS ON:	1,877	8,760
CLG HRS SAVED:	2,640	
HTG HRS SAVED:	4,224	
C/H HRS SAVED:	6,883	

CONSTANTS	
HOAUHC:	21,1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
НОАОН:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

LOCATION: FT. RILEY, KS

BUILDING NAME: LIBRARY MAIN

# ENERGY CALCULATION SUMMARY

System Type: 15

BLDG: 7264

System Name: Small Single Zone air handling unit

System Number: AHU-4

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	37,073.01	297.35	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	20,763.17	54.56	
Sub Total	10.99	59,478.99	351.91	
Economizer	0.00	2,008.84	0.00	
Ventilation/Recirculation	0.00	0.00	13.18	
DDC Control	0.00	2,354.75	57.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			422.15	3.0

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	(RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO ' POINTS	AO POINTS	DI POINTS	AI POINTS	COST
	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	Ö	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

31,240

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7264	BUILDING NAME:	LIBRARY MAIN

**Building UA:** 4,363 CONDITIONED SQFT:

### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-5

### PYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 21 BRICK AND CMU TRAINING 0700-2100 M-F

Weeks of Winter: 32 Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	16	16	16	16	16	0

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,200
CFM-CLG:	1,200
%OA:	15%
%Area:	8%
CHILLER CAP (TONS):	C
KW-TON:	0.00
BLR CAP INPUT (BTUH):	С
BLR CAP OUTPUT (BTUH):	0

### REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 900 3,360 1,440 HTG HRS ON: 5,376 H/C HRS ON: 8,760 2,346 **CLG HRS SAVED:** 2,460

3,936

6,414

HOURS CALCULATIONS

HTG HRS SAVED:

C/H HRS SAVED:

HOAUHC:	21.1
HOAUH:	34
COAUHC:	(
COAUC:	(
HOAOHC:	17.3
нолон:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7264 BUILDING NAME: LIBRARY MAIN

ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit

System Number: AHU-5

- FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	2,899.71	24.36	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.92	0.00	0.00	
Night Setback	0.00	1,700.88	10.65	
Sub Total	0.92	4,738.49	35.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	258.76	11.13	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.92	4,997.25	4614	* 3.00

UMCS UNCTN NO:	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

**DATE:** 09-Dec-95

**ENERGY CALCULATION PARAMETERS** 

BLDG: 7264 BUILDING NAME: LIBRARY MAIN	BLDG:	7264	BUILDING NAME:	LIBRARY MAIN	
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**Building UA:** 4,363 CONDITIONED SQFT: 31,240

### SYTEM INFORMATION

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

### TRYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 21 BRICK AND CMU TRAINING 0700-2100 M-F

Weeks of Winter: 32 Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	11	7	7	7	7	7	11
REQ STOP:	22	22	22	22	22	22	22

NPUTS	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	3,691,000
BLR CAP OUTPUT (BTUH):	2,953,000

### COURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 3,360 1,940 HTG HRS ON: 5,376 3,104 H/C HRS ON: 8,760 5,058 **CLG HRS SAVED:** 1,420 HTG HRS SAVED: 2,272 C/H HRS SAVED: 3,702

CONSTANTS	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

BLDG: 7264

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: AJN/CWW

**DATE**: 09-Dec-95

BUILDING NAME: LIBRARY MAIN

ENERGY CALCULATION SUMMARY

System Type: 3
System Name: Small steam boiler
System Number: BLR-1

<b>FUNCTION</b>	kW/yr k	Wh/yr I	ABtulyr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	0:00	4.00

UMCS FUNCTN NO.		The second read of the second	ÃO	DÍ	RY AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TO	IAL:	0	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7264	BUILDING NAME:	LIBRARY MAIN	
	Building UA:	4,363	CONDITIONED SQFT:	31,240

# SYTEM INFORMATION

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 21 BRICK AND CMU TRAINING 0700-2100 M-F

Weeks of Winter: 32
Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	13	0	11	0	11	9	9
REQ STOP:	17	0	19	0	19	17	17

Motor HP:	10.00
HP Effic:	0.86
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	C
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	60
KW-TON:	1.10
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	C

# REQUIRED HR/YR PRESENT HR/YR CLG HRS ON: 720 3,360 HTG HRS ON: 1,152 5,376 H/C HRS ON: 1,877 8,760 CLG HRS SAVED: 2,640

4,224

6,883

HOURS CALCULATIONS

HTG HRS SAVED:

C/H HRS SAVED:

	<u>ONSTANTS</u>
21.1	HOAUHC:
34	HOAUH:
0	COAUHC:
0	COAUC:
17.3	HOAOHC:
27.9	ноаон:
0.000885	COAOHC:
0.00234	COAOC:
0.17	DC DUTY:
0,17	DC DEMAND:
0.000207	ECC:
0.0000784	ECHC:
0.000221	NSUCHC:
0.000584	NSUCC:
0.0000919	DDCCHC:
0.000243	DDCCC:
30500	NSC:
31900	DDCH:
305	OPT:
17.5	CHWR:
	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7264

BUILDING NAME: LIBRARY MAIN

# ENERGY CALCULATION SUMMARY

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr- MH/yr</u> —
Schedule ST/SP	0.00	18,363.08	0.00
Opt ST/SP	0.00	2,121.49	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	5.32	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	5.32	20,484.57	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	1,050.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	50.49	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.0
TOTAL	55.81	21,534.57	0.00 4.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	O	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7264	BUILDING NAME:	LIBRARY MAIN

Building UA: 4,363 CONDITIONED SQFT: 31,240

# SYTEM INFORMATION ....

System Type: 8
System Name: Air cooled DX compressor
System Number: CH-2

# TYPICAL BUILDING INFORMATION

Catagory Number: C	Construction:	Use:	Occupancy HRS:	Occupancy Days:
. 21 E	BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of W	inter:	32		
Weeks of Sun	nmer:	20		

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	13	0	11	0	11	9	9
REQ STOP:	17	0	19	0	19	17	17

0

Ö

### **INPUTS** Motor HP: 0.00 HP Effic: 0.64 0.80 Load Factor: CFM-HTG: 0 0 CFM-CLG: 0% %OA: %Area: 0% 5 CHILLER CAP (TONS): KW-TON: 1.10

BLR CAP INPUT (BTUH):

**BLR CAP OUTPUT (BTUH):** 

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	720	3,360
HTG HRS ON:	1,152	5,376
H/C HRS ON:	1,877	8,760
CLG HRS SAVED:	2,640	
HTG HRS SAVED:	4,224	-
C/H HRS SAVED:	6,883	-

<u>CONSTANTS</u>	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	O
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7264 BUILDING NAME: LIBRARY MAIN

ENERGY CALCULATION SUMMARY

System Type: 8
System Name: Air cooled DX compressor
System Number: CH-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	87.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	4.21	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	4.21	87.50	0.00 3.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMMA  DI POINTS	RY AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

LOCATION: FT. RILEY, KS

### DATE TO DE

ENERGY C	ALCUL	ATION P	'ARAI	MET	<b>ERS</b>
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BLDG: 7264 BUILDING NAME: LIBRARY MAIN	BLDG:	7264	BUILDING NAME:	LIBRARY MAIN
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Building UA: 4,363 CONDITIONED SQFT: 31,240

### SYMEMINE OR MARKON WAR

System Type: 27
System Name: Perimeter radiation valve
System Number: RAD-1

### TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:
21 BRICK AND CMU TRAINING 0700-2100 M-F

Weeks of Winter: 32
Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24.	24	24
REQ START:	13	0	11	0	11	9	9
REQ STOP:	17	0	19	0	19	17	17

INPUTS	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Агеа:	15%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

### REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 720 3,360 HTG HRS ON: 1,152 5,376 H/C HRS ON: 1,877 8,760 CLG HRS SAVED: 2,640 HTG HRS SAVED: 4,224

6,883

HOURS CALCULATIONS

C/H HRS SAVED:

	CONSTANTS
21.1	HOAUHC:
34	HOAUH:
0	COAUHC:
0	COAUC:
17.3	HOAOHC:
27.9	нолон:
0.000885	COAOHC:
0.00234	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000207	ECC:
0.0000784	ECHC:
0.000221	NSUCHC:
0.000584	NSUCC:
0.0000919	DDCCHC:
0.000243	DDCCC:
30500	NSC:
31900	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

System Number:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

RAD-1

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7264	BUILDING NAME: LIBRARY MAIN
7.2	ENERGY CALCULATION SUMMAR)
System Type:	27
Official office	The state of the s

FUNCTION	kW/vr	<u>kWh/yr</u>	MBtu/yr MH	ΧĽ
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				3.0
Maintenance, Run Time, and Safety Alarms				3.0
and Safety Alarms TOTAL	0.00	0.00	0.00	

UMCS UNCTN	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMM/ DI POINTS	ARY  AI  POINTS	COST
NO.** 25	Optimum start/stop - Perimeter Rad Valve; Night setback - Perimeter	0	1	0	1	\$456.00
	Rad Valve				**************************************	er erromaniskinin enger e o oost

# BUILDING 7270 BN HQ BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7270	BUILDING NAME:	BN HQ BLDG

Building UA: 2,347 CONDITIONED SQFT: 6,130

### SYTEM INFORMATION &

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	. 0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	7	6	0
REQ STOP:	0	17	17	17	16	17	0

	Addition to the contract of th
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	6,310
CFM-CLG:	6,310
%OA:	40%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,060 3,360 HTG HRS ON: 5,376 1,696 H/C HRS ON: 2,764 8,760 **CLG HRS SAVED:** 2,300 HTG HRS SAVED: 3,680 C/H HRS SAVED: 5,996

CONSTANTS	
HOAUHC:	16.2
HOAUH:	- 26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

EMC NO: 1406-001

BLDG: 7270

BUILDING NAME: BN HQ BLDG

# **ENERGY CALCULATION SUMMARY**

10 System Type:

System Name: Multizone air handling unit

AHU-1 System Number:

0.00 0.00 0.00 4.62 0.00 <b>4.62</b>	17,479.57 691.23 0.00 0.00 35,605.05 53,775.86	245.19 0.00 0.00 0.00 85.90 331.09	TRE TREESON . SPACE AND AN AND AN AND AND AND AND AND AND A
0.00 4.62 0.00 4.62	0.00 0.00 35,605.05 <b>53,775.86</b>	0.00 0.00 85.90 331.09	
4.62 0.00 <b>4.62</b>	0.00 35,605.05 <b>53,775.86</b>	0.00 85.90 <b>331.09</b>	
0.00 <b>4.62</b>	35,605.05 <b>53,775.86</b>	85.90 <b>331.09</b>	
4.62	53,775.86	331.09	
0.00	4 200 22		
	1,386.33	0.00	
0.00	197.84	12.47	
0.00	4,063.09	70.64	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			5.00
	0.00 0.00 0.00 0.00	0.00         4,063.09           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         4,063.09         70.64           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	<b>NRY</b>	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0 .	1	0	\$112.00
	TOTAL:	1	8	1	11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7270	BUILDING NAME:	BN HQ BLDG	

**Building UA:** 2,347 CONDITIONED SQFT: 6,130

# SYTEM INFORMATION:

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 7 BRICK AND CMU BATTALION 0700-1800 M-F; SAT Weeks of Winter: 32 Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	7	6	0
REQ STOP:	0	17	17	17	16	17	0

Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	450,000
BLR CAP OUTPUT (BTUH):	360,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,060	3,360
HTG HRS ON:	1,696	5,376
H/C HRS ON:	2,764	8,760
CLG HRS SAVED:	2,300	•
HTG HRS SAVED:	3,680	1
C/H HRS SAVED:	5,996	

<u>CONSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.1
COAUHC:	0.000257
COAUC:	0.00068
HOAOHC:	33.3
HOAOH:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

BLDG: 7270 BUILDING NAME: BN HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 1
System Name: Small hot water boiler

System Number: BLR-1

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,495.71	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	2,702.55	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	2.55	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	2,702.55	2.55	4.00

UMCS	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	<b>IRY</b>	
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	O	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7270		BUILDING N	AME: BN HQ BLDG	
	Building UA:		2,347	CONDITIONED SQF	FT: 6,130
YTEM	INFORMATION	1.0	eta, 124 - 10 (22)		g <sub>il</sub> som state
	System Type:	8			
	System Name:	Air cooled DX	compressor		
	System Number:	CH-1	P. S. S. S. S. S. S. S. S. S. S. S. S. S.		

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	7	6	0
REQ STOP:	0	17	17	17	16	17	0

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	25
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,060	3,360
HTG HRS ON:	1,696	5,376
H/C HRS ON:	2,764	8,760
CLG HRS SAVED:	2,300	
HTG HRS SAVED:	3,680	
C/H HRS SAVED:	5,996	:

•	<u>CONSTANTS</u>
16.2	HOAUHC:
26.1	HOAUH:
0.000257	COAUHC:
0.00068	COAUC:
33.3	HOAOHC:
53.5	НОАОН:
0.00115	COAOHC:
0.00305	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.00021	ECC:
0.0000795	ECHC:
0.000941	NSUCHC:
0.00249	NSUCC:
0.000233	DDCCHC:
0.000616	DDCCC:
36600	NSC:
30100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PRE

PREPARED BY: JM/CWW

BLDG: 7270	BUILDING NAME: BN HQ BLDG
ALMAN TO THE RESERVE	ENERGY CALCULATION SUMMARY
System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-1

FUNCTION -	- kWlyr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	437.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	21.04	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	:		3.00
and Safety Alarms TOTAL	21.04	437.50	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO POINTS	T SUMMA  DI POINTS	ARY AL POINTS	COST
	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	O	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #:** DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

# **ENERGY CALCULATION PARAMETERS**

	BLDG:	7270	BUILDING NAME:	BN HQ BLDG
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Building UA: 2,347 CONDITIONED SQFT: 6,130

### SYTEM INFORMATION

System Type: 27
System Name: Perimeter radiation valve

System Number: RAD-1

### TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:
7 BRICK AND CMU BATTALION 0700-1800 M-F; SAT

Weeks of Winter: 32
Weeks of Summer: 20

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	7	6	0
REQ STOP:	0	17	17	17	16	17	0

### INPUTS Motor HP: 0.00 **HP Effic:** 0.00 Load Factor: 0.80 CFM-HTG: 0 0 CFM-CLG: 0% %OA: %Area: 20% **CHILLER CAP (TONS):** 0 KW-TON: 0.00 **BLR CAP INPUT (BTUH):** 0 BLR CAP OUTPUT (BTUH): 0

# HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON	1,060	3,360
HTG HRS ON	1,696	5,376
H/C HRS ON	2,764	8,760
CLG HRS SAVED	2,300	
HTG HRS SAVED	3,680	-
C/H HRS SAVED	5,996	

<u>NSTANTS</u>	
HOAUHC:	16.2
HOAUH:	26.
COAUHC:	0.00025
COAUC:	0.00068
HOAOHC:	33.3
НОАОН:	53.5
COAOHC:	0.00115
COAOC:	0.00305
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.00021
ECHC:	0.0000795
NSUCHC:	0.000941
NSUCC:	0.00249
DDCCHC:	0.000233
DDCCC:	0.000616
NSC:	36600
DDCH:	30100
OPT:	305
CHWR:	17.5
CNWR:	(
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/CWW

EMC NO: 1406-001

BLDG:	7270	BUILDING NA	ME: BN HQ BLDG
		<b>ENERGY CALCU</b>	LATION SUMM

System Type: 27

System Name: Perimeter radiation valve

RAD-1 System Number:

<u>FUNCTION</u>	<u>kW/yr</u> .	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.00	0.00	0.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	RY	
UMCS FUNCTN	UMCS APPLICATION	DO	AO	DI	AI	COST
NO.	And the second of the second o	POINTS	POINTS	POINTS	POINTS	
25	Optimum start/stop - Perimeter Rad Valve; Night setback - Perimeter Rad Valve	0	1	0	1	\$456.00
	TOTAL:	0	1	0	1	\$456.00

# BUILDING 7285 CLOTHING SALES

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

### **ENERGY CALCULATION PARAMETERS**

BLDG:	7285	BUILDING NAME:	CLOTHING SALES	
	Building UA:	4,894	CONDITIONED SQFT:	17,042

# SYTEM INFORMATION ....

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	7 BRICK AND CMU	RETAIL SHOP	0800-2200	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	. 9	9	9	11	9	10
REQ STOP:	0	18	18	18	19	18	16

<u>INPUTS</u>	
Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	18,700
CFM-CLG:	18,700
%OA:	10%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

### 

3,776

6,153

HTG HRS SAVED:

C/H HRS SAVED:

<u>CONSTANTS</u>	
HOAUHC:	17.4
HOAUH:	28
COAUHC:	0.000233
COAUC:	0.000615
HOAOHC:	36.7
HOAOH: ·	59.1
COAOHC:	0.00124
COAOC:	0.00328
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000795
ECHC:	0.0003
NSUCHC:	0.000455
NSUCC:	0.0012
DDCCHC:	0.000248
DDCCC:	0.000657
NSC:	397000
DDCH:	207000
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7285 BUILDING NAME: CLOTHING SALES

ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit

System Number: AHU-1

FUNCTION	kW/yr	kWh/yr	<u>MBtu/yr</u>	<u>MH/yr</u>
Schedule ST/SP	0.00	35,821.88	200.20	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	52,351.58	1,942.92	
Sub Total	0.00	89,816.28	2,143.12	
Economizer	0.00	14,626.07	0.00	
Ventilation/Recirculation	0.00	132.89	9.92	
DDC Control	0.00	12,090.89	1,013.06	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	<b>ARY</b>	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	1	3	0	<b>6</b>	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7285	BUILDING N	IAME: C	CLOTHING SALES	
	Building UA:	4,894		CONDITIONED SQFT:	17,042

### SYTEM INFORMATION

System Type: 1
System Name: Small hot water boiler
System Number: BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	7 BRICK AND CMU	RETAIL SHOP	0800-2200	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	iummer:	20		

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0.	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	11	9	10
REQ STOP:	0	18	18	18	19	18	16

<u>INPUTS</u>	
Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,000,000
BLR CAP OUTPUT (BTUH):	1,600,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	- )
HTG HRS SAVED:	3,776	5
C/H HRS SAVED:	6,153	, }

•	CONSTANTS
17.4	HOAUHC:
28	HOAUH:
0.000233	COAUHC:
0.000615	COAUC:
36.7	HOAOHC:
59.1	ноаон:
0.00124	COAOHC:
0.00328	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000795	ECC:
0.0003	ECHC:
0.000455	NSUCHC:
0.0012	NSUCC:
0.000248	DDCCHC:
0.000657	DDCCC:
397000	NSC:
207000	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7285 BUILDING NAME: CLOTHING SALES

ENERGY CALCULATION SUMMARY

System Type: 1
System Name: Small hot water boiler

System Number: BLR-1

FUNCTION	<u>kW/yr</u> = -	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	2,580.36	0.00
Opt ST/SP	0.00	208.42	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	. 0.00	0.00
Sub Total	0.00	2,788.79	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	11.34
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time,			
and Safety Alarms			

MCS NCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

PF

EMC NO: 1406-001

ENT CNTRCT #: DACA 01-94-D-003 LOCATION: FT. RILEY, KS DATE: 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7285	BUILDING NAME:	CLOTHING SALES	
	Building UA:	4,894	CONDITIONED SQFT:	17,042

### SYTEM INFORMATION

System Type: 9

System Name: Water cooled chiller

System Number: CH-1

TYPICALBUILD	ING INFORMATION	e de la companya de		
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	RETAIL SHOP	0800-2200	M-F; SAT-SUN
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	11	9	10
REQ STOP:	0	18	18	18	19	18	16

<u>INPUTS</u>	
Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	40
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON	1,000	3,360
HTG HRS ON	1,600	5,376
H/C HRS ON	2,607	8,760
CLG HRS SAVED	2,360	-
HTG HRS SAVED	3,776	
C/H HRS SAVED	6,153	-

	V. A. A. A. A. A. A. A. A. A. A. A. A. A.
17.	HOAUHC:
2	HOAUH:
0.00023	COAUHC:
0.00061	COAUC:
36	HOAOHC:
59	HOAOH:
0.0012	COAOHC:
0.0032	COAOC:
0.1	DC DUTY:
0.1	DC DEMAND:
0.00079	ECC:
0.000	ECHC:
0.00045	NSUCHC:
0.001	NSUCC:
0.00024	DDCCHC:
0.00065	DDCCC:
39700	NSC:
20700	DDCH:
30	OPT:
17	CHWR:
	CNWR:
5.6	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7285 BUILDING NAME: CLOTHING SALES

ENERGY CALCULATION SUMMARY

System Type: 9

System Name: Water cooled chiller

System Number: CH-1

FUNCTION	<u>kWlyr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	12,711.62	0.00
Opt ST/SP	0.00	1,642.82	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	4.12	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	4.12	14,354.44	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	700.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	33.66	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		15,054.44	0.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
13	Chilled water reset and alarms - Water Cooled Chiller	1	1	1	7	\$3,527.00
14	Condenser water reset and alarms - Water Cooled Chiller	0	1	0	2	\$936.00
15	Chiller demand limiting - Water Cooled Chiller	2	1	1	2	\$1,545.00

# BUILDING 7305 APP INSTRUCTION BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/AMS/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7305	BUILDING NAME:	APP INSTR BLDG	
	Building UA:	3,353	CONDITIONED SQFT:	9,872

### SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	21 BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	22	22	22	22	17	0

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

REQUIRED	PRESENT
HR/YR	HR/YR
1,400	3,360
2,240	5,376
3,650	8,760
1,960	-
3,136	•
5,110	
֡	HR/YR 1,400 2,240 3,650 1,960 3,136

<u>vstants</u>	#85 NOTE \$177.0 \$561.0 NOTES
HOAUHC:	21.
HOAUH:	3-
COAUHC:	1
COAUC:	
HOAOHC:	17.
нолон:	27.
COAOHC:	0.00088
COAOC:	0.0023
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00020
ECHC:	0.000078
NSUCHC:	0.00022
NSUCC:	0.00058
DDCCHC:	0.000091
DDCCC:	0.00024
NSC:	3050
DDCH:	3190
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS/CWW

BLDG: 7305 BUILDING NAME: APP INSTR BLDG ENERGY CALCULATION SUMMARY

System Type:

System Name: Air cooled DX compressor

System Number: ACCU-1

- FUNCTION	kW/yr .	<u>kWh/yr</u> i	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	ra ya ya wananana 📆 👝 200 Maria (1921)
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	<del></del>
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				, 3.0
TOTAL	3.37	70.00	0.00	3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	ND COST AO POINTS	T SUMMA DI POINTS	AT POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	O	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7305	BUILDING NAME:	APP INSTR BLDG

Building UA: 3,353 CONDITIONED SQFT: 9,8	Building UA:	3,353	CONDITIONED SQFT:	0.070

#### SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32		
Weeks of Si	ımmer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	22	22	22	22	17	0

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### **HOURS CALCULATIONS** REQUIRED PRESENT HR/YR HR/YR **CLG HRS ON:** 1,400 3,360 HTG HRS ON: 2,240 5,376 H/C HRS ON: 8,760 3,650 CLG HRS SAVED: 1,960 HTG HRS SAVED: 3,136 C/H HRS SAVED: 5,110

- 200 - 1 - 200 -	to hall a North and College (1), 1986, (1), 1987, (2), (2), (2), (2), (2), (2), (2), (2)
HOAUHC:	21.1
HOAUH:	34
COAUHC:	O
COAUC:	0
HOAOHC:	17.3
HOAOH:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 **DATE:** 16-Sep-95

PREPARED BY: AJN/AMS/CWW

BUILDING NAME: APP INSTR BLDG BLDG: 7305 

# ENERGY CALCULATION SUMMARY

System Type:

System Name: Air cooled DX compressor

System Number: ACCU-2

- FUNCTION	kW/yr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	70.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	3.37	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	3.37	70.00	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	POINT A  DO POINTS	AO	T SUMMA  DI POINTS	ARY AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1.	0.45		0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

EMC NO: 1406-001 **DATE:** 16-Sep-95

PREPARED BY: AJN/AMS/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7305	BUILDING NAME:	APP INSTR BLDG	
	Building UA:	3,353	CONDITIONED SQFT:	9,872

#### SYTEM INFORMATION

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-3

#### TYPICAL BUILDING INFORMATION Occupancy Days: Use: Occupancy HRS: Catagory Number: Construction: TRAINING 0700-2100 21 BRICK AND CMU Weeks of Winter: 32

20 Weeks of Summer:

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7.	7	7.	7	7	0
REQ STOP:	0	22	22	22	22	17	0

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	4
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,400	3,360
HTG HRS ON:	2,240	5,376
H/C HRS ON:	3,650	8,760
CLG HRS SAVED:	1,960	
HTG HRS SAVED:	3,136	;
C/H HRS SAVED:	5,110	)

Bangares a. 461 1 111 11	Control of the South Control of the
21.1	HOAUHC:
34	HOAUH:
0	COAUHC:
0	COAUC:
17.3	HOAOHC:
27.9	HOAOH:
0.000885	COAOHC:
0.00234	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000207	ECC:
0.0000784	ECHC:
0.000221	NSUCHC:
0.000584	NSUCC:
0.0000919	DDCCHC:
0.000243	DDCCC:
30500	NSC:
31900	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

PREPARED BY: AJN/AMS/CWW

LOCATION: FT. RILEY, KS

BUILDING NAME: APP INSTR BLDG

ENERGY CALCULATION SUMMARY

System Type: 8

BLDG: 7305

System Name: Air cooled DX compressor

System Number: ACCU-3

FUNCTION	kW/yr ==	<u>kWh/yr</u>	MBtu/yr MH/y	Œ
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	70.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	3.37	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	ND COS  AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	Ö	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7305		BUILDING NAME:	APP INSTR BLDG	
E	Building UA:	3,353	CONDITIONED SQFT:	

CONDITIONED SQFT:

9,872

#### SYTEM INFORMATION .....

System Type: 8

System Name: Air cooled DX compressor

System Number: ACCU-4

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2:	BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32	•	
Weeks of St	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	22	22	22	22	17	0.

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	3
KW-TON:	1.10
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,400	3,360
HTG HRS ON:	2,240	5,376
H/C HRS ON:	3,650	8,760
CLG HRS SAVED:	1,960	•
HTG HRS SAVED:	3,136	•
C/H HRS SAVED:	5,110	•

*	ONSTANTS
21.	HOAUHC:
3	HOAUH:
	COAUHC:
	COAUC:
17.	HOAOHC:
27.	HOAOH:
0.00088	COAOHC:
0.0023	COAOC:
0.1	DC DUTY:
0.1	DC DEMAND:
0.00020	ECC:
0.000078	ECHC:
0.00022	NSUCHC:
0.00058	NSUCC:
0.000091	DDCCHC:
0.00024	DDCCC:
3050	NSC:
3190	DDCH:
30	OPT:
17.	CHWR:
	CNWR:
5.6	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/AMS/CWW

BUILDING NAME: APP INSTR BLDG

ENERGY CALCULATION SUMMARY

System Type:

BLDG: 7305

System Name: Air cooled DX compressor

ACCU-4 System Number:

- <u>kW/yr</u>	- <u>kWh/yr</u>	MBtu/yr	MH/yr
0.00	.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	47.25	0.00	
0.00	0.00	0.00	
2.27	0.00	0.00	
			3.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         .00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         .00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         47.25         0.00           0.00         0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO	T SUMMA DI POINTS	RY AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	O	\$243.00
	TOTAL:		0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS PREPARED BY: AJN/AMS/CWW

EMC NO: 1406-001 DATE: 16-Sep-95

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7305 BUILDING NAME	E: APP INSTR BLDG
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Building UA: 3,353 CONDITIONED SQFT: 9,872

#### SYTEM INFORMATION ....

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	1 BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7		0
REQ STOP:	0	22	22	22	22	17	0

INPUTS	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	1,800
%OA:	30%
%Area:	22%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,400	3,360
HTG HRS ON:	2,240	5,376
H/C HRS ON:	3,650	8,760
CLG HRS SAVED:	1,960	•
HTG HRS SAVED:	3,136	
C/H HRS SAVED:	5,110	

<u>CONSTANTS</u>	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
НОАОН:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS/CWW

BLDG: 7305 BUILDING NAME: APP INSTR BLDG eritetak eritetak

**ENERGY CALCULATION SUMMARY** 

System Type: :15

System Name: Small Single Zone air handling unit

System Number: AHU-1

FUNCTION	<u>kWiyr</u>	<u>kWh/yr</u> +	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	2,310.34	58.22	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.92	0.00	0.00	
Night Setback	0.00	2,032.76	22.50	
Sub Total	0.92	4,480.99	80.72	
Economizer	0.00	515.09	0.00	
Ventilation/Recirculation	0.00	0.00	3.48	
DDC Control	0.00	603.78	23.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	* '
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.04
TOTAL	0.92	5,599.87	107.73	* 3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO	AO POINTS	T SUMMA  DI POINTS	ARY AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7305	BUILDING NAME:	APP INSTR BLDG

Building UA: 3,353 CONDITIONED SQFT: 9,872

# <u>Syteminformation</u>

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
21	BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of \	Alimton	32		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	22	22	22	22	17	0

<u>INPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	1,800
%OA:	30%
%Area:	22%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# | REQUIRED | PRESENT | HR/YR | HR/YR | | CLG HRS ON: 1,400 | 3,360 | | HTG HRS ON: 2,240 | 5,376 | | H/C HRS ON: 3,650 | 8,760 |

CLG HRS SAVED:	1,960
HTG HRS SAVED:	3,136
C/H HRS SAVED:	5,110

<u>CONSTANTS</u>	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
НОАОН:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/AMS/CWW

BLDG: 7305 BUILDING NAME: APP INSTR BLDG

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

<u>FUNCTION</u>	<u>kWiyr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	2,310.34	58.22
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.92	0.00	0.00
Night Setback	0.00	2,032.76	22.50
Sub Total	0.92	4,480.99	80.72
Economizer	0.00	515.09	0.00
Ventilation/Recirculation	0.00	0.00	3.48
DDC Control	0.00	603.78	23.53
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.92	5,599.87	107.73

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/AMS/CWW

LOCATION: FT. RILEY, KS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7305	BUILDING NAME:	APP INSTR BLDG	
	Building UA:	3,353	CONDITIONED SQFT:	9,872
OVTELL	NEÓDUATION			-

#### SYTEM INFORMATION

System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	1 BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	22	22	22	22	17	0

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	1,800
%OA:	30%
%Area:	22%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		PRESENT HR/YR
CLG HRS ON:	1,400	3,360
HTG HRS ON:	2,240	5,376
H/C HRS ON:	3,650	8,760
CLG HRS SAVED:	1,960	
HTG HRS SAVED:	3,136	
C/H HRS SAVED:	5,110	

<u>CONSTANTS</u>	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
НОАОН:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/AMS/CWW

BLDG: 7305

BUILDING NAME: APP INSTR BLDG

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

<u>FUNCTION</u>	<u>kWlyr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	2,310.34	58.22	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.92	0.00	0.00	
Night Setback	0.00	2,032.76	22.50	
Sub Total	0.92	4,480.99	80.72	
Economizer	0.00	515.09	0.00	
Ventilation/Recirculation	0.00	0.00	3.48	
DDC Control	0.00	603.78	23.53	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			į	3.
and Safety Alarms TOTAL	0.92	5,599.87	107.73	

UMCS UNCTN NO.	UMCS APPLICATION	DO - POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #:** DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS/CWW

## **ENERGY CALCULATION PARAMETERS**

**BLDG: 7305 BUILDING NAME:** APP INSTR BLDG

Building UA: 3,353

CONDITIONED SQFT:

9,872

SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	21 BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	22	22	22	22	17	0

<u>INPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,200
CFM-CLG:	1,200
%OA:	15%
%Area:	12%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,400	3,360
HTG HRS ON:	2,240	5,376
H/C HRS ON:	3,650	8,760
CLG HRS SAVED:	1,960	_ )
HTG HRS SAVED:	3,136	7
C/H HRS SAVED:	5,110	)·

	<u>CONSTANTS</u>
21.1	HOAUHC:
34	HOAUH:
0	COAUHC:
0	COAUC:
17.3	HOAOHC:
27.9	нолон:
0.000885	COAOHC:
0.00234	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000207	ECC:
0.0000784	ECHC:
0.000221	NSUCHC:
0.000584	NSUCC:
0.0000919	DDCCHC:
0.000243	DDCCC:
30500	NSC:
31900	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/AMS/CWW

BLDG: 7305

BUILDING NAME: APP INSTR BLDG

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

FUNCTION	<u>kW/yr</u>	. <u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,310.34	19.41	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.92	0.00	0.00	
Night Setback	0.00	1,355.17	12.27	
Sub Total	0.92	3,803.41	31.68	
Economizer	0.00	343.39	0.00	
Ventilation/Recirculation	0.00	0.00	1.16	
DDC Control	0.00	402.52	12.84	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.92	4,549.32	45.67	^ 3.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	(RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL	1	3	0	6	\$2,116.00

# BUILDING 7350 VEHICLE MAINTENANCE SHOP ORG

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW/AMS

LOCATION: FT. RILEY, KS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7350	BUILDING NAME:	:	VEH MNT SHOP ORG

Building UA: 9,281 CONDITIONED SQFT: 21,345

#### 

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	13 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32'
Weeks of Summer: 20

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAI:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	15%
%Агеа:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
R CAP OUTPUT (BTUH):	0

		HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	;

<u>ONSTANTS</u>	
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	C
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW/AMS

BUILDING NAME: VEH MNT SHOP ORG

#### ENERGY CALCULATION SUMMARY

System Type: 15

7350

BLDG:

System Name: Small Single Zone air handling unit

System Number: AHU-1

FUNCTION	kW/yr	kWh/yr -	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,707.21	0.00	
Opt ST/SP	0.00	137.90	0.00	·
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	43.76	
Sub Total	0.00	1,845.11	43.76	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	18.84	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	0.00	1,845.11	62.60	3.0

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7350	BUILDING NAME:	VEH MNT SHOP ORG
<u> </u>	Building UA:	9,281	CONDITIONED SQFT:

**Building UA:** 9,281 21,345

#### SYTEM INFORMATION ....

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

MACATERNIED	NG INFORMATION	A Comment of the Comm		11 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 3	2		
Weeks of S	ummer: 2	0		

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:		THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7		0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	C
BLR CAP OUTPUT (BTUH):	0

#### REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,000 3,360 5,376 HTG HRS ON: 1,600 2,607 8,760 H/C HRS ON:

CLG HRS SAVED:	2,360
HTG HRS SAVED:	3,776
C/H HRS SAVED:	6.153

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW/AMS

BUILDING NAME: VEH MNT SHOP ORG BLDG: 7350 

# ENERGY CALCULATION SUMMARY

System Type: 15

Small Single Zone air handling unit System Name:

System Number: AHU-2

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
0.00	1,707.21	0.00	
0.00	137.90	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	52.51	
0.00	1,845.11	52.51	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	22.61	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         1,707.21           0.00         137.90           0.00         0.00           0.00         0.00           0.00         0.00           0.00         1,845.11           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         1,707.21         0.00           0.00         137.90         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         52.51           0.00         1,845.11         52.51           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7350 BUILDING NAME: VEH MNT SHOP ORG

Building UA: 9,281

CONDITIONED SQFT:

21,345

#### SYTEM INFORMATION :- - - --

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F Weeks of Winter: 32 Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>inputs</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	•
HTG HRS SAVED:	3,776	<del>-</del> ·
C/H HRS SAVED:	6,153	:

<u>ONSTANTS</u>	•
HOAUHC:	C
HOAUH:	C
COAUHC:	C
COAUC:	C
НОАОНС:	C
НОАОН:	0
COAOHC:	0
COAOC:	O
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	C
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW/AMS

BLDG: 7350 BUILDING NAME: VEH MNT SHOP ORG

# ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

FUNCTION	kW/yr	kWh/yr	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	1,707.21	0.00
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	52.51
Sub Total	0.00	1,845.11	52.51
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	22.61
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.00	1,845.11	75:12

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW/AMS

# **ENERGY CALCULATION PARAMETERS**

BLC	DG: 7350	BUILDING NAME:	VEH MNT SHOP ORG	
	Building UA:	9,281	CONDITIONED SQFT:	21,345

SYTEM INFORMATION TO THE STATE OF THE STATE	
System Type: 15	
System Name: Small Single Zone air handling unit	
System Number: AHU-4	

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	3 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of S	ummer: 20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	. 0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	. 7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	ŀ
HTG HRS SAVED:	3,776	i
C/H HRS SAVED:	6,153	-

CONSTANTS	<b>*</b>
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67
JAN.	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW/AMS

BLDG: 7350 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	1,707.21	0.00
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	52.51
Sub Total	0.00	1,845.11	52.51
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	22.61
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.0
TOTAL	0.00	1,845.11	75.12

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	i (1884) - Karilli Lattin I. Amerika i Shami 1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW/AMS

LOCATION: FT. RILEY, KS

# ENERGY CALCULATION PARAMETERS

BLDG:	7350		BUILDING NAME:	VEH MNT SHOP ORG	
	Building UA:		9,281	CONDITIONED SQFT:	21,345
X					The state of the s
	INFURMATION		Alberta de la companya del companya della companya	Last 20 (4.44 Disc) (4.44 TS 10.10 to 4.11 to 4.11	
HIEM	System Type:	15		<u> </u>	
			Zone air handling unit	(1.25 (1.55	in a

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of S	ummer: 20			

# SYSTEM OPERATING SCHEDULE

	'SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	. 0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7		0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	15%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

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0
0.000105
0.000278
0.000161
0.000426
94300
40600
305
17.5
17.5
5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS DATE: 16-Sep-95
PREPARED BY: AJN/CWW/AMS

EMC NO: 1406-001

BLDG: 7350 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-5

FUNCTION : : -	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr MH/yr</u>
Schedule ST/SP	0.00	1,707.21	0.00
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	61.26
Sub Total	0.00	1,845.11	61.26
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	26.38
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:	
TOTAL	0.00	1,845.11	87.64

	TYPICAL SYSTEM POINT AND COST SUMMARY					
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW/AMS

# **ENERGY CALCULATION PARAMETERS**

RI DG: 7350	BUILDING NAME:	VEH MNT SHOP ORG

Building UA: 9,281 CONDITIONED SQFT: 21,345

#### SYTEM INFORMATION

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-6

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
, , ,	3 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of S	ummer: 20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	1.50
HP Effic:	0,74
oad Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	C
%OA:	15%
%Area:	15%
AP (TONS):	(
KW-TON:	0.00
UT (BTUH):	(
UT (BTUH):	(

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	- [.
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	1

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	C
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW/AMS

BLDG: 7350 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-6

FUNCTION.	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,567.94	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	131.28	
Sub Total	0.00	4,936.91	131.28	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	56.52	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED B

PREPARED BY: AJN/CWW/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7350	BUILDING NAME:	VEH MNT SHOP ORG	
	Building UA:	9,281	CONDITIONED SQFT:	21,345

## SYTEMINFORMATION .....

System Type: 16
System Name: Heating and Ventilating Unit
System Number: MAU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	4 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32	•		
Weeks of S	ummer: 20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

imas illikilli ja 1903-jalli falli lähi likilli ja 1904-1904 – 1904-1904 illiki talen ja 1904-1904 illiki tale	0.00
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		
HTG HRS ON:		
H/C HRS ON:		
CLG HRS SAVED:	2,360	- )
HTG HRS SAVED:	3,776	- 5
C/H HRS SAVED:	6,153	3

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: AJN/CWW/AMS

LOCATION: FT. RILEY, KS

BUILDING NAME: VEH MNT SHOP ORG

# ENERGY CALCULATION SUMMARY

System Type: 16

BLDG: 7350

System Name: Heating and Ventilating Unit

System Number: MAU-1

FUNCTION -	- <u>kW/yr</u>	<u>kWh/yr</u>	-MBtulyr	<u>MH/yr</u>
Schedule ST/SP	0.00	5,778.25	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,244.98	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	30.07	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
and Safety Alarms TOTAL	0.00	6,244.98	30.07	3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7350 BUILDING N	AME: VEH MNT SHOP ORG
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Building UA: 9,281 CONDITIONED SQFT: 21,345

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-2

#### TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:

14 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:		THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

0

#### **INPUTS** 2.00 Motor HP: 0.78 HP Effic: Load Factor: 0.80 CFM-HTG: 4,120 0 CFM-CLG: 15% %OA: 5% %Area: 0 CHILLER CAP (TONS): 0.00 KW-TON: 0 **BLR CAP INPUT (BTUH):**

## HOURS CALCULATIONS

**BLR CAP OUTPUT (BTUH):** 

		PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED	2,360	
HTG HRS SAVED	3,776	i
C/H HRS SAVED	6,153	

#### **CONSTANTS** HOAUHC: 0 0 HOAUH: 0 COAUHC: 0 COAUC: 0 HOAOHC: 0 нолон: COAOHC: 0 0 COAOC: 0.17 DC DUTY: 0.17 DC DEMAND: ECC: 0 0 ECHC: NSUCHC: 0 0 NSUCC: 0.0000199 DDCCHC: 0.0000526 DDCCC: NSC: 0 DDCH: 64800 305 OPT: 17.5 CHWR: 0 CNWR: 5.67 OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

PREPARED BY: AJN/CWW/AMS

BLDG: 7350 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit
System Number: MAU-2

kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	5,778.25	0.00
0.00	466.73	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	6,244.98	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	30.07
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		3.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         5,778.25           0.00         466.73           0.00         0.00           0.00         0.00           0.00         0.00           0.00         6,244.98           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0.	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7350	BUILDING NAME:	VEH MNT SHOP ORG
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Building UA: 9,281 CONDITIONED SQFT: 21,345

#### SYTEM INFORMATION #

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-3

#### TYPICAL BUILDING INFORMATION

Catagory Number: Construction: L 14 METAL PANEL AND CMU

VEH MAINT SHOP

Occupancy HRS: 0700-1800 Occupancy Days:

M-F

Weeks of Winter: 32

Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	. 0	17	17	17	17	17	0

#### INPUTS 7.50 Motor HP: 0.83 **HP Effic:** 0.80 Load Factor: 12,200 CFM-HTG: CFM-CLG: 0 %OA: 0% %Area: 10% CHILLER CAP (TONS): 0 0.00 KW-TON: 0 **BLR CAP INPUT (BTUH):** BLR CAP OUTPUT (BTUH): 0

		PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	ר ו
HTG HRS SAVED:	3,776	r r
C/H HRS SAVED:	6,153	- ,

	<u>CONSTANTS</u>
0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	ноаон:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0	NSUCHC:
0	NSUCC:
0.0000199	DDCCHC:
0.0000526	DDCCC:
0	NSC:
64800	DDCH:
305	OPT:
17.5	CHWR:
C	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW/AMS

BLDG: 7350

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-3

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr Mt	<u>l/yr</u>
Schedule ST/SP	0.00	20,338.60	0.00	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	21,981.42	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	60.14	
HW OA Reset	0.00	0.00	0.00	<u> </u>
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	21,981.42	60.14	3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7350	BUILDING NAME:	VEH MNT SHOP ORG
ſ	Building UA:	9.281	CONDITIONED SQFT:

9,281 **Building UA:** 

21,345

SYSTEM IN EDEM AT ION -

System Type: 20

System Name: Infrared Radiant Heaters

System Number: RAD-1

TYPICAL BUILDING INFORMATION						
Catagory Number: Construction:	Use:	Occupancy HRS:	Occupancy Days:			
13 METAL PANEL AND CM	U VEH MAINT SHOP	0700-1800	M-F			

32 Weeks of Winter: 20 Weeks of Summer:

SYSTEM OPERATING SCHEDULE

):::::::::::::::::::::::::::::::::::::	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0.	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	C
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	
KW-TON:	0.00
BLR CAP INPUT (BTUH):	
BLR CAP OUTPUT (BTUH):	(

		PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED	2,360	7
HTG HRS SAVED	3,776	
C/H HRS SAVED	6,153	e L

CONSTANTS	•
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67
The state of the s	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW/AMS

BLDG: 7350 BUILDING NAME: VEH MNT SHOP ORG

**ENERGY CALCULATION SUMMARY** 

System Type: 20

System Name: Infrared Radiant Heaters

System Number: RAD-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	1,707.21	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	210.05	
Sub Total	0.00	1,845.11	210.05	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	, , , , , , , , , , , , , , , , , , ,
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:		0.00
TOTAL	0.00	1,845.11	210.05	. 0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	A POINT A  DO POINTS	AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7350	BUILDING NAME:	VEH MNT SHOP ORG	
	Building UA:	9,281	CONDITIONED SQFT:	21,345
page of the same o				

# 

System Type: 20
System Name: Infrared Radiant Heaters
System Number: RAD-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
	3 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of S	summer: 20			

# SYSTEM OPERATING SCHEDULE

20. Carlotter 110 7. MARCE The prost This variable statement and a	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR 3,360 CLG HRS ON: 1,000 HTG HRS ON: 1,600 5,376 H/C HRS ON: 2,607 8,760 CLG HRS SAVED: 2,360 3,776 HTG HRS SAVED: C/H HRS SAVED: 6,153

•	<u>CONSTANTS</u>
0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
0	НОАОНС:
0	нолон:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
C	ECC:
C	ECHC:
0.000105	NSUCHC:
0.000278	NSUCC:
0.000161	DDCCHC:
0.000426	DDCCC:
94300	NSC:
40600	DDCH:
305	OPT:
17.5	CHWR:
(	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW/AMS

BLDG: 7350

BUILDING NAME: VEH MNT SHOP ORG

#### ENERGY CALCULATION SUMMARY

20 System Type:

System Name: Infrared Radiant Heaters

RAD-2 System Number:

FUNCTION -	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	1,144.09	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	140.03	
Sub Total	0.00	1,236.51	140.03	
Economizer	0.00	0.00	0.00	
/entilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	, , , , , , , , , , , , , , , , , , , ,
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.0
TOTAL	0.00	1,236.51	140.03	.0.0

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00

#### BUILDING 7404 ENLISTED BARRACKS W/O DINING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

#### PREPARED BY: AJNCWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 7404	G: 7404 BUILDING NAME: ENL BARRACKS W/O DIN		
Building UA:	18,554	CONDITIONED SQFT:	50,967
SYTEM INFORMATION			100 July 150 July 104-14
System Type: 10			

STIEMINE	KMATIUN TE
****	stem Type: 10
5	stem Name: Multizone air handling unit
Sys	em Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

FRI:

SAT:

# SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: THUR:

PRES START: PRES STOP: REQ START: **REQ STOP:** 

<u>INPUTS</u>	
Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	29,135
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

1000000	937 (SM 5 7)
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

		PRESENT
	HR/YR	HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	. 0	1
HTG HRS SAVED:	: 0	
C/H HRS SAVED:	. 0	-

HOURS CALCULATIONS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJNCWW

BLDG: 7404		ENL BARRACKS W/	
ENER CONTROL	GY CALCULAT	ION SUMMARY	

System Type:

System Name: Multizone air handling unit

System Number: AHU-1

.00 0.00 0.00 0.00 0.00 0.00 0.00 14,390.36	0.00 0.00 0.00 0.00 0.00 0.00 0.00	
0.00 0.00 0.00 0.00 0.00 0.00	0.00 0.00 0.00 <b>0.00</b> 0.00 0.00	
0.00 0.00 <b>0.00</b> 0.00 0.00	0.00 0.00 <b>0.00</b> 0.00 0.00	
0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	
0.00 0.00 0.00	<b>0.00</b> 0.00 0.00	
0.00	0.00 0.00	
0.00	0.00	
14,390.36	0.00	
	0.00	
0.00	0.00	
0.00	0.00	
0.00	0.00	
0.00	0.00	
		5.00
	0.00	

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	Ō	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	8	1.	11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJNCWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 7404	BUILDING NAME:	ENL BARRACKS W/O DIN
BLUG: /404	BOILDING NAME.	EITE BY II III O TO THE TIME

CONDITIONED SQFT:

18,554 **Building UA:** 

50,967

#### SYTEM INFORMATION.

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-2

#### TYPICAL BUILDING INFORMATION Occupancy Days: Occupancy HRS: Catagory Number: Construction: Use: M-F; SAT-SUN 0000-2400 BARRACKS 5 BRICK AND CMU Weeks of Winter: 32 20 Weeks of Summer:

#### SYSTEM OPERATING SCHEDULE

COLLEGE CONTRACTOR CON	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

NPUTS	
Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	28,225
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR 3,360 CLG HRS ON: 3,360 5,376 5,376 HTG HRS ON: 8,760 H/C HRS ON: 8,760 0 CLG HRS SAVED: 0 HTG HRS SAVED: 0 C/H HRS SAVED:

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

LOCATION: FT. RILEY, KS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

PREPARED BY: AJNCWW

EMC NO: 1406-001

BLDG: 7404

BUILDING NAME: ENL BARRACKS W/O DIN

#### ENERGY CALCULATION SUMMARY

10 System Type:

System Name: Multizone air handling unit

AHU-2 System Number:

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/y	Ε
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.12	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	4.12	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	13,940.89	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.0
TOTAL	4:12	13,940.89	0.00	* 5.0

	TYPICAL SYSTEM	POINT A	ND COS	TSUMM	<b>S</b> RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	8	1	11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJNCWW

#### **ENERGY CALCULATION PARAMETERS**

**BLDG: 7404 BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA: 18,554 CONDITIONED SQFT:

50,967

SYTEM INFORMATION TO

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU		BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	. 0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>inputs</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	3,210,000
BLR CAP OUTPUT (BTUH):	2,568,000

#### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	-
HTG HRS SAVED:	0	•
C/H HRS SAVED:	0	•

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJNCWW

BLDG: 7404 BUILDING NAME: ENL BARRACKS W/O DIN

**ENERGY CALCULATION SUMMARY** 

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtwyr MH	Ŋτ
Schedule ST/SP	0.00	.00	0.00	244
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	18.20	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.0
TOTAL	0.00	0.00	18.20	4.00

UMCS	TYPICAL SYSTEM	POINT A	IND COS	T SUMMA	ARY	
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	O O	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJNCWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7404	BUILDING NAME:	ENL BARRACKS W/O DIN	
	Building UA:	18,554	CONDITIONED SQFT:	50,967

#### SYTEM INFORMATION -

System Type: 3
System Name: Small steam boiler
System Number: BLR-2

TYPICAL BUILD	ING INFORMAT	<u>ion</u>			
Catagory Number:	Construction:	Ì	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	E	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks of	Winter:	32			
Weeks of S	lummer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

NPUTS	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	813,000
BLR CAP OUTPUT (BTUH):	650,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	]
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

**EMC NO:** 1406-001 **DATE:** 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJNCWW

BLDG: 7404 BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type: 3
System Name: Small steam boiler
System Number: BLR-2

FUNCTION	kWhr	kWh/yr	MBtu/yr MH/yr	
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,			:	4.00
Maintenance, Run Time, and Safety Alarms				
TOTAL	0.00	0.00	0.00	4.00

FUMCS FUNCTI NO.		. DO	AO	DI	RY AI POINTS	COST
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TOTAL:	1 .	0.	3	1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJNCWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7404	BUILDING NAME:	ENL BARRACKS W/O DIN
BLDG:	/404	BUILDING NAME:	ENL BARRACKS W/O DIN

Building UA: 18,554 CONDITIONED SQFT: 50,967

#### SYTEM INFORMATION:

System Type: 25
System Name: Hot water radiation pump
System Number: RAD-1

### Catagory Number: Construction:

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:
4 SANDSTONE BLOCK ADMINISTRATION 0700-1700 M-F

Weeks of Winter: 32

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

SUN: MON: TUE: WED: THUR: FRI: SAT: PRES START: 0 0. 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 0 **REQ START:** 0 0 0 0 0 0 **REQ STOP:** 24 24 24 24 24 24 24

# Motor HP: 4.00 HP Effic: 0.78

Load Factor: 0.80 CFM-HTG: 0 CFM-CLG: 0 %OA: 0% %Area: 50% CHILLER CAP (TONS): 0 KW-TON: 0.00 BLR CAP INPUT (BTUH): 0 **BLR CAP OUTPUT (BTUH):** 0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	C	)
HTG HRS SAVED:	C	ĵ
C/H HRS SAVED:	C	<u>,</u>

CONSTANTS	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJNCWW

BUILDING NAME: ENL BARRACKS W/O DIN BLDG: 7404

ENERGY CALCULATION SUMMARY

25 System Type:

Hot water radiation pump System Name:

RAD-1 System Number:

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	.00	0.00
0.00	933.46	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	933.46	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		3.4
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         .00           0.00         933.46           0.00         0.00           0.00         0.00           0.00         0.00           0.00         933.46           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS FUNCTN	TYPICAL SYSTEN  UMCS APPLICATION	POINT A	ND COST	TSUMMAI DI	RY AI	COST
NO.		POINTS	POINTS	POINTS	POINTS	
23	Scheduled start/stop control - HW	1	0	1	1	\$570.00
	Pump; Optimum start/stop - HW					
	Pump; Night setback - HW Pump					
	TOTAL:	1	0	1	1	\$570.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJNCWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7404	<b>BUILDING NAME:</b>	ENL BARRACKS W/O DIN
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Building UA:	18,554	CONDITIONED SQFT:	50,967

SYTEM INFORMATION	Batter Harrist District	
System Type:	25	
System Name:	Hot water radiation pump	
System Number:	RAD-2	

Catagory Number:	Construction:	Use:		Occupancy HRS:	Occupancy Days:
	4 SANDSTONE BLOCK	ADMINIST	RATION	0700-1700	M-F
Weeks o	f Winter:	32	•		
Weeks of S	Summer:	20.			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	2.00
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	50%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	)
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	,

CONSTANTS	
HOAUHC:	27.8
HOAUH:	44.6
COAUHC:	0
COAUC:	0
HOAOHC:	40.4
HOAOH:	65
COAOHC:	0.000877
COAOC:	0.00232
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.0000629
ECHC:	0.0000238
NSUCHC:	0.000609
NSUCC:	0.00161
DDCCHC:	0.000411
DDCCC:	0.00109
NSC:	131000
DDCH:	43100
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95 PREPARED BY: AJNCWW

LOCATION: FT. RILEY, KS

BUILDING NAME: ENL BARRACKS W/O DIN BLDG: 7404

ENERGY CALCULATION SUMMARY

25 System Type:

4414

System Name: Hot water radiation pump

RAD-2 System Number:

CHILDREN AND PARTY OF THE PARTY		CONTROL A CONTROL OF THE PARTY	MH/yr
0.00	.00	0.00	
0.00	466.73	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	466.73	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00;	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
		:	3.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00     466.73       0.00     0.00       0.00     0.00       0.00     0.00       0.00     466.73       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00	0.00       466.73       0.00         0.00       0.00       0.00         0.00       0.00       0.00         0.00       0.00       0.00         0.00       466.73       0.00         0.00       0.00       0.00         0.00       0.00       0.00         0.00       0.00       0.00         0.00       0.00       0.00         0.00       0.00       0.00         0.00       0.00       0.00         0.00       0.00       0.00         0.00       0.00       0.00         0.00       0.00       0.00

	TYPICAL SYSTEM	A POINT A	AND COS	TSUMMA	RY	
UMCS						-00-
FUNCTN NO.	UMCS APPLICATION	DO ' POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	anii ika in in in in in in in in in in in in in	0	1	1	\$570.00
	TOTAL	1	0	1	1	\$570.00

#### BUILDING 7410 BN ADMINISTRATION& CLASSROOMS

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**DATE:** 16-Sep-95

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

PREPARED BY: CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 7410	BUILDING NAME:	BN ADMIN & CLRM
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**Building UA:** 3,001 CONDITIONED SQFT: 12,599

#### SYTEM INFORMATION

System Type: 11

System Name: Variable Air Volume air handling unit

System Number: AHU-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32		

Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	. 0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	8	8	8	0
REQ STOP:	0	17	17	17	17	17	0

#### INPUTS

Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	6,150
CFM-CLG:	6,150
%OA:	20%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	-
C/H HRS SAVED:	6,414	·

#### CONSTANTS

16.2	HOAUHC:
26.1	HOAUH:
0.000257	COAUHC:
0.00068	COAUC:
33.3	НОАОНС:
53.5	HOAOH:
0.00115	COAOHC:
0.00305	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.00021	ECC:
0.0000795	ECHC:
0.000941	NSUCHC:
0.00249	NSUCC:
0.000233	DDCCHC:
0.000616	DDCCC:
36600	NSC:
30100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: CWW

BLDG: 7410 BUILDING NAME: BN ADMIN & CLRM

ENERGY CALCULATION SUMMARY

System Type: 11
System Name: Variable Air Volume air handling unit

System Number: AHU-1

FUNCTION	<u>kWlyr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	36,572.70	127.80	
Opt ST/SP	0.00	1,642.82	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	10.99	0.00	0.00	
Night Setback	0.00	37,116.30	109.84	
Sub Total	10.99	75,331.81	237.63	
Economizer	0.00	1,147.23	0.00	
Ventilation/Recirculation	0.00	96.41	6.08	
DDC Control	0.00	3,362.31	90.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			334.04	5.0 5.0

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	ARY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	O O	1	\$348.00
32	Direct digital control - VAV AHU	0	3	0	11	\$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	4	1	14	\$4,826.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #:** DACA 01-94-D-0033

DDEDAE

**EMC NO**: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7410	BUILDING NAME:	BN ADMIN & CLRM

Building UA: 3,001

CONDITIONED SQFT:

12,599

SYTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Manage IID.	1.50
Motor HP:	1.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	450,000
BLR CAP OUTPUT (BTUH):	360,000

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	į.
HTG HRS SAVED:	C	)
C/H HRS SAVED:		)

and the second second second second second second second second second second second second second second second

<u>ONSTANTS</u>	MARKEY EX
HOAUHC:	16.
HOAUH:	26.
COAUHC:	0.00025
COAUC:	0.0006
HOAOHC:	33.
НОАОН:	53.
COAOHC:	0.0011
COAOC:	0.0030
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.0002
ECHC:	0.000079
NSUCHC:	0.00094
NSUCC:	0.0024
DDCCHC:	0.00023
DDCCC:	0.00061
NSC:	3660
DDCH:	3010
OPT:	30
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: CWW

BUILDING NAME: BN ADMIN & CLRM BLDG: 7410

ENERGY CALCULATION SUMMARY

System Type: Small hot water boiler System Name:

BLR-1 System Number:

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	413.69	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	413.69	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	2.55
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		į	4.00
TOTAL	0.00	413.69	2.55

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95 LOCATION: FT. RILEY, KS PREPARED BY: CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 7410 BUILDING NAME: BN ADMIN & CLRI
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**Building UA:** 3,001 CONDITIONED SQFT: 12,599

#### SYTEMINFORMATION

System Type: 6 System Name: Small air cooled chiller System Number: CH-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU		BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32	•		
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	8	8	8	8	8	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	1.50
· · · · · · · · · · · · · · · · · · ·	
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	900	3,360
HTG HRS ON:	1,440	5,376
H/C HRS ON:	2,346	8,760
CLG HRS SAVED:	2,460	
HTG HRS SAVED:	3,936	-
C/H HRS SAVED:	6,414	-

	6/2// Gifter - 12/
HOAUHC:	16
HOAUH:	26
COAUHC:	0.00025
COAUC:	0.0006
HOAOHC:	33
НОАОН:	53
COAOHC:	0.0011
COAOC:	0.0030
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.0002
ECHC:	0.000079
NSUCHC:	0.00094
NSUCC:	0.0024
DDCCHC:	0.00023
DDCCC:	0.0006
NSC:	3660
DDCH:	3010
OPT:	30
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: CWW

BLDG: 7410 BUILDING NAME: BN ADMIN & CLRM ENERGY CALCULATION SUMMARY

System Type:

Small air cooled chiller System Name:

System Number: CH-1

<u>FUNCTION</u>	<u>kWiyr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	2,975.94	0.00
Opt ST/SP	0.00	368.97	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.93	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.93	3,344.90	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	525.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	25.25	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.00
TOTAL	26.17	3,869.90	0.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	\RY	
UMCS FUNCTN NO.	, UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	Ò	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
	TOTAL:	2	0	3	2	\$1,481.00

#### BUILDING 7424 ENLISTED BARRACKS W/O DINING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95 PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 7424 BUILDING NAME: ENL BARRACKS W/O DIN

> **Building UA:** 15,693

CONDITIONED SQFT:

50,967

SYTEMINEORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

YPICA BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 5 BRICK AND CMU BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32 Weeks of Summer: 20

SYSTEM OPERATING SCHEDULE

SUN: MON: TUE: WED: THUR: FRI: SAT: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 **REQ START:** 0 0 0 0 0 0 0 **REQ STOP:** 24 24 24 24 24 24 24

<u>INPUTS</u>	
Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	29,135
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS		

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	(	)
HTG HRS SAVED:		)
C/H HRS SAVED:		)

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7424 BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type: 10
System Name: Multizone air handling unit
System Number: AHU-1

TEUNCTION TO	<u>kWlyr</u>	kWh/yr	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	4.12	0.00	0.00
Night Setback	0.00	. 0.00	0.00
Sub Total	4.12	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	14,390.36	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:	5.0
TOTAL	4.12	14,390.36	0.00 5.0

UMCS UNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO	AO POINTS	DI POINTS	ΑΊ	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

**BLDG: 7424 BUILDING NAME:** ENL BARRACKS W/O DIN

Building UA: 15,693 CONDITIONED SQFT: 50,967

#### SYTEMINEORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-2

# YPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 5 BRICK AND CMU BARRACKS 0000-2400 M-F; SAT-SUN Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

7 50	Motor HP:
7.50	MOLOT NF:
0.83	HP Effic:
0.80	Load Factor:
0	CFM-HTG:
28,225	CFM-CLG:
0%	%OA:
0%	%Area:
0	CHILLER CAP (TONS):
0.00	KW-TON:
0	BLR CAP INPUT (BTUH):
0	BLR CAP OUTPUT (BTUH):

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	, C	_
HTG HRS SAVED:	C	•
C/H HRS SAVED:	C	- i

	Natura beriotis NCD / L
HOAUHC:	(
HOAUH:	(
COAUHC:	(
COAUC:	(
HOAOHC:	(
НОАОН:	(
COAOHC:	(
COAOC:	(
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	(
ECHC:	(
NSUCHC:	(
NSUCC:	(
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	(
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

**EMC NO:** 1406-001 **DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7424 BUILDING NAME: ENL BARRACKS W/O DIN

**ENERGY CALCULATION SUMMARY** 

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-2

FUNCTION	<u>kWlyr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	4.12	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	4.12	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	13,940.89	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			5.0
TOTAL	4.12	13,940.89	0.00 * 5.0

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	8	1	<u></u>	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001

NT CNTRCT #: DACA 01-94-D-0033 DATE: 09-Dec-95

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7424	<b>BUILDING NAME:</b> ENL BARRACKS W/O DIN

Building UA: 15,693 CONDITIONED SQFT: 50,967

#### EXTEN INFORMATION

System Type: 3
System Name: Small steam boiler
System Number: BLR-1

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>NPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	3,050,000
BLR CAP OUTPUT (BTUH):	2,140,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	i I
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	

	<u>CONSTANTS</u>
: 0	HOAUHC:
: 0	HOAUH:
: 0	COAUHC:
: 0	COAUC:
: 0	HOAOHC:
: 0	НОАОН:
: 0	COAOHC:
: 0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
: 0	ECC:
: 0	ECHC:
: 0	NSUCHC:
: 0	NSUCC:
0.0000556	DDCCHC:
: 0.000147	DDCCC:
20000	NSC:
: 33900	DDCH:
: 0	OPT:
: 17.5	CHWR:
: 0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 09-Dec-95

PREPARED BY: AJN/CWW

BLDG: 7424 BUILDING NAME: ENL BARRACKS W/O DIN

**ENERGY CALCULATION SUMMARY** 

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

<u>FUNCTION</u>	kW/yr	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00.	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,			1	4.00
Maintenance, Run Time, and Safety Alarms		:	i .	
TOTAL	0.00	0.00	00,0	4.00

		YPICAL SYSTE	M POINT A	ND COST	SUMMA	RY	
UMCS			NA.		DI	AI	COST
FUNCT NO.	N UMICS A	PPLICATION	DO POINTS	AO POINTS		POINTS	
7	Steam Boiler M	lonitoring	1	0	3	1	\$1,015.00
		TOTAL:		0	3		\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7424	BUILDING NAME:	ENL BARRACKS W/O DIN
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Building UA: 15,693 CONDITIONED SQFT: 50,967

#### SYTEM INFORMATION

System Type: 1
System Name: Small hot water boiler
System Number: BLR-2

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

650,000

#### INPUTS Motor HP: 0.00 HP Effic: 0.00 Load Factor: 0.80 CFM-HTG: 0 CFM-CLG: 0 %OA: 0% %Area: 0% CHILLER CAP (TONS): 0 KW-TON: 0.00 **BLR CAP INPUT (BTUH):** 813,000

#### HOURS CALCULATIONS

BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	
HTG HRS SAVED:	0	
C/H HRS SAVED:	0	•

	CONSTANTS
0	HOAUHC:
. 0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	НОАОН:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0	NSUCHC:
0	NSUCC:
0.0000556	DDCCHC:
0.000147	DDCCC:
20000	NSC:
33900	DDCH:
0	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7424

BUILDING NAME: ENL BARRACKS W/O DIN

#### ENERGY CALCULATION SUMMARY

System Type: 1
System Name: Small hot water boiler
System Number: BLR-2

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtulyr MHA	Œ
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	V · · · · · · · · · · · · · · · · · · ·
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	4.61	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	0.00	4.61	* 4.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7424	BUILDING NAME:	ENL BARRACKS W/O DIN
	7-76-7	DOILDING NAME:	

Building UA: 15,693 CONDITIONED SQFT: 50,967

#### SYTEM INFORMATION ==

System Type: 25
System Name: Hot water radiation pump
System Number: RAD-1

TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:

5 BRICK AND CMU BARRACKS 0000-2400 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	. 0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	2.00
HP Effic:	0.71
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	50%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	0	•
HTG HRS SAVED:	0	ī
C/H HRS SAVED:	0	1

HOAUHC:	(
HOAUH:	C
COAUHC:	C
COAUC:	C
HOAOHC:	C
НОАОН:	C
COAOHC:	
COAOC:	C
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	
ECHC:	C
NSUCHC:	C
NSUCC:	C
DDCCHC:	0.0000556
DDCCC:	0.000147
NSC:	20000
DDCH:	33900
OPT:	0
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7424 BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type: 25
System Name: Hot water radiation pump
System Number: RAD-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	0.00	0.00	- 3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO	DI	RY AI POINTS	-COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
	TOTAL	4	0	1	1	\$570.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

DLDG. 1424 DOILDING NAME. ENL DARRACKS W/O DIN	BLDG:	7424	BUILDING NAME:	ENL BARRACKS W/O DIN
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Building UA: 15,693 CONDITIONED SQFT: 50,967

#### SYTEM INFORMATION ....

System Type: 25
System Name: Hot water radiation pump
System Number: RAD-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
<u> </u>	5 BRICK AND CMU	BARRACKS	0000-2400	M-F; SAT-SUN
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	0	0	0	0	0	0
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	3,360	3,360
HTG HRS ON:	5,376	5,376
H/C HRS ON:	8,760	8,760
CLG HRS SAVED:	, 0	
HTG HRS SAVED:		- )
C/H HRS SAVED:		)

	<u>CONSTANTS</u>
0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	HOAOH:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0	NSUCHC:
0	NSUCC:
0.0000556	DDCCHC:
0.000147	DDCCC:
20000	NSC:
33900	DDCH:
0	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

7424

BLDG:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BUILDING NAME: ENL BARRACKS W/O DIN

ENERGY CALCULATION SUMMARY

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-2

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr - MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	0.00	0.00

FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
23 Sche Pum	eduled start/stop control - HW p; Optimum start/stop - HW p; Night setback - HW Pump	1	0	1	1	\$570.00

#### BUILDING 7432 ADMINISTRATION & SUPPLY BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 7	7432	BUILDING NAME:	ADMIN & SUPPORT BLDG	
	Building UA:	4,746	CONDITIONED SQFT:	13.500

#### SYTEM INFORMATION

System	Type:	1
0,000	· , pc.	<u>'</u>

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days
	3 BRICK AND CMU	ND CMU ADMIN & SUPPLY 0700-160		0700-1600	M-F
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,119,000
BLR CAP OUTPUT (BTUH):	895,000

## HOURS CALCULATIONS

The state of the s		PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	!
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	· :

	<u>CONSTANTS</u>
0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	ноаон:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0.000226	NSUCHC:
0.000598	NSUCC:
0.0000188	DDCCHC:
0.0000498	DDCCC:
93100	NSC:
29900	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7432 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 1
System Name: Small hot water boiler

System Number: BLR-1

FUNCTION	<u>kWiyr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	13,808.31	0.00
Opt ST/SP	0.00	1,115.34	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	14,923.66	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	6.34
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	O	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7432	BUILDING NAME:	ADMIN & SUPPORT BLD	G
	Building UA:	4,746	CONDITIONED SQFT:	13

#### SYTEM INFORMATION

13,500

System Type: 6 System Name: Small air cooled chiller System Number: CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

7500000	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17:	17	17	17	0

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	20
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,000 3,360 HTG HRS ON: 1,600 5,376 8,760 H/C HRS ON: 2,607 CLG HRS SAVED: 2,360

HTG HRS SAVED: C/H HRS SAVED: 3,776

6,153

<u>ONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

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EMC NO: 1406-001 DATE: 16-Sep-95

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7432

**BUILDING NAME: ADMIN & SUPPORT BLDG** 

#### ENERGY CALCULATION SUMMARY

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	5,348.54	0.00
Opt ST/SP	0.00	691.23	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	1.73	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	1.73	6,039.77	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	350.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	16.83	0.00	0.00
Remote Monitoring,			4.0
Maintenance, Run Time, and Safety Alarms			/
TOTAL	18.56	6,389.77	0.00 * 4.0

	TYPICAL SYSTEM	I POINT A	ND COS	T SUMM/	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO • POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	O	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
	TOTAL:	2	0	3	2	\$1,481.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #:** DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

13,500

## **ENERGY CALCULATION PARAMETERS**

BLDG: 7432 BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA: 4,746 CONDITIONED SQFT:

SYTEM INFORMATION

System Type: 19
System Name: Fan coil unit
System Number: FC-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	. 0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	. 17	0

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	12,000
CFM-CLG:	12,000
%OA:	20%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	- !
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7432 BUILDING NAME: ADMIN & SUPPORT BLDG

System Type:	19	İ
System Name:	Fan coil unit	
System Number:	FC-1	

0.00 0.00 0.00	9,415.45 466.73	0.00	
<u> </u>	466.73		
0.00		0.00	
5.00	0.00	0.00	
0.00	0.00	0.00	
0.00	16,686.55	154.65	
0.00	26,568.73	154.65	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			0.00
The state of the s	0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00     16,686.55       0.00     26,568.73       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00	0.00     16,686.55     154.65       0.00     26,568.73     154.65       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00       0.00     0.00     0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO	AO POINTS	T SUMMA  DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95 PREPARED BY: AJN/CWW

EMC NO: 1406-001

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 7432 BUILDING NAME: ADMIN & SUPPORT BLDG **Building UA:** 4,746

CONDITIONED SQFT: 13,500

#### SYTEM INFORMATION

System Type: 16 System Name: Heating and Ventilating Unit System Number: HV-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	. 24	24	24	24	24
REQ START:	0.	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	•
HTG HRS SAVED:	3,776	1
C/H HRS SAVED:	6,153	-

<u>NSTANTS</u>	
HOAUHC:	(
HOAUH:	(
COAUHC:	
COAUC:	C
HOAOHC:	C
НОАОН:	C
COAOHC:	C
COAOC:	C
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	C
ECHC:	C
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7432 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit

System Number: HV-1

FUNCTION	<u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,256.53	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	57.44	
Sub Total	0.00	3,519.57	57.44	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	18.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3
TOTAL	0.00	3,519.57	75.89	3

	TYPICAL SYSTEM POINT AND COST SUMMARY					
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
33	Outside air damper ventilation and	0		0	0	\$27 - <b>\$1,4</b>

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95

EMC NO: 1406-001

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7432	BUILDING NAME:	ADMIN & SUPPORT BLDG
BLDG:	1432	BUILDING NAME.	ADMIN & GOLL OLL DEDG

4,746 **Building UA:** 

CONDITIONED SQFT:

13,500

#### SYTEM NEORMATION :

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-2

#### TYPICAL BUILDING INFORMATION

Occupancy Days: Occupancy HRS: Construction: Use: Catagory Number: M-F 0700-1600 3 BRICK AND CMU **ADMIN & SUPPLY** 

Weeks of Winter: 32 20 Weeks of Summer:

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7.	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

0

0

#### **INPUTS** 1.00 Motor HP: 0.69 HP Effic: 0.80 Load Factor: 2,400 CFM-HTG: 0 CFM-CLG: 100% %OA: 13% %Area: 0 CHILLER CAP (TONS): 0.00 KW-TON:

#### HOURS CALCULATIONS

**BLR CAP INPUT (BTUH):** 

**BLR CAP OUTPUT (BTUH):** 

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	; )
HTG HRS SAVED:	3,776	5
C/H HRS SAVED:	6,153	3

:ONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	C
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7432 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-2

FUNCTION	kWiyr	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	3,256.53	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	57.44	
Sub Total	0.00	3,519.57	57.44	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	18.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			75.89	, 3.0 3.0

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7432	BUILDING NAME:	ADMIN & SUPPORT BLDG

Building UA: 4,746 CONDITIONED SQFT: 13,500

SYTEM INFORMATION

System Type: 16
System Name: Heating and Ventilating Unit

System Number: HV-3

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32		
Weeks of S		20		

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
HILLER CAP (TONS):	0
KW-TON:	0.00
CAP INPUT (BTUH):	0
AP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	-

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

BLDG: 7432

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit
System Number: HV-3

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	3,256.53	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	57.44	
Sub Total	0.00	3,519.57	57.44	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	18.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	0.00	3,519.57	75.89	3.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 7432 BUILDING NAME: ADMIN & SUPPORT BLDG

Building UA: 4,746

CONDITIONED SQFT:

13,500

SYTEM INFORMATIONS

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-4

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

1.00	Motor HP:
0.69	HP Effic:
0.80	Load Factor:
2,400	CFM-HTG:
Ţ,	CFM-CLG:
100%	%OA:
13%	%Area:
(	CHILLER CAP (TONS):
0.00	KW-TON:
(	BLR CAP INPUT (BTUH):
(	BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	<u>.</u> I
HTG HRS SAVED:	3,776	1
C/H HRS SAVED:	6,153	-

LOUDS ON CHEATIONS

HOAUHC:	
HOAUH:	
COAUHC:	
COAUC:	
HOAOHC:	
нолон:	
COAOHC:	
COAOC:	
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	
ECHC:	
NSUCHC:	0.00022
NSUCC:	0.00059
DDCCHC:	0.000018
DDCCC:	0.000049
NSC:	9310
DDCH:	2990
OPT:	30
CHWR:	17
CNWR:	
OAR:	5.0

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7432 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: HV-4

FUNCTION	<u>kWlyr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	3,256.53	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	57.44	
Sub Total	0.00	3,519.57	57.44	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	18.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	0.00	3,519.57	75.89	<b>`</b> 3.0

MCS NCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95 PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7432	BUILDING NAME:	ADMIN & SUPPORT BLDG

**Building UA:** 4,746 CONDITIONED SQFT: 13,500

SYTEM INFORMATION		
System Type:	16	
System Name:	Heating and Ventilating Unit	
System Number:	HV-5	:

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	. 0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,400
CFM-CLG:	0
%OA:	100%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,000 3,360 HTG HRS ON: 1,600 5,376 H/C HRS ON: 2,607 8,760 CLG HRS SAVED: 2,360 HTG HRS SAVED: 3,776 C/H HRS SAVED: 6,153

HOAUHC:	
	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BUILDING NAME: ADMIN & SUPPORT BLDG

#### ENERGY CALCULATION SUMMARY

System Type: 16
System Name: Heating and Ventilating Unit

System Number: HV-5

BLDG: 7432

FUNCTION :	kW/yr	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	3,256.53	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	57.44	
Sub Total	0.00	3,519.57	57.44	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	18.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	!			3.0
TOTAL	0.00	3,519.57	75.89	× 3.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO - POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

## BUILDING 7450 REGIMENTAL HQ BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7450	BUILDING N	AME: REGIMENTAL HQ BLDG	
	Building UA:	2,563	CONDITIONED SQFT:	9,850
<b>SYTEN</b>	INFORMATION			
	System Type: 15			

SYTEM INFORMATION	
System Type: 15	
System Name: Small Single Zone	air handling unit
System Number: AHU-1	

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	7 BRICK AND CMU	BATTALION	0700-1800	M-F; SAT
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	825
CFM-CLG:	825
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	- !
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

	CONSTANTS
16.2	HOAUHC:
26.1	HOAUH:
0.000257	COAUHC:
0.00068	COAUC:
33.3	HOAOHC:
53.5	HOAOH:
0.00115	COAOHC:
0.00305	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.00021	ECC:
0.0000795	ECHC:
0.000941	NSUCHC:
0.00249	NSUCC:
0.000233	DDCCHC:
0.000616	DDCCC:
36600	NSC:
30100	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7450 BUILDING NAME: REGIMENTAL HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
0.00	3,913.24	78.75	
0.00	137.90	0.00	**************************************
0.00	0.00	0.00	
0.92	0.00	0.00	
0.00	4,574.22	9.38	
0.92	8,625.36	88.13	Second Marketine Communication
0.00	188.10	0.00	
0.00	0.00	0.00	
0.00	551.27	7.71	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
,			3.00
	0.00 0.00 0.00 0.92 0.00 0.92 0.00 0.00 0.00 0.00 0.00	0.00         3,913.24           0.00         137.90           0.00         0.00           0.92         0.00           0.00         4,574.22           0.92         8,625.36           0.00         188.10           0.00         0.00           0.00         551.27           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         3,913.24         78.75           0.00         137.90         0.00           0.00         0.00         0.00           0.92         0.00         0.00           0.00         4,574.22         9.38           0.92         8,625.36         88.13           0.00         188.10         0.00           0.00         0.00         0.00           0.00         551.27         7.71           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	\RY	
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7450	BUILDING NAME:	REGIMENTAL HQ BLDG

Building UA: 2,563 CONDITIONED SQFT: 9,850

#### SYTEMINEORMATION

System Type: 1
System Name: Small hot water boiler
System Number: BLR-1

## TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:
2 BRICK AND CMU ADMINISTRATION 0600-1700 M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	. 6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

## | Motor HP: 0.50 | HP Effic: 0.66

motor in :	0.00
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	450,000
BLR CAP OUTPUT (BTUH):	360,000

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	•
HTG HRS SAVED:	3,616	-
C/H HRS SAVED:	5,892	

#### **CONSTANTS** HOAUHC: 0 HOAUH: 0 COAUHC: 0 COAUC: 0 0 HOAOHC: 0 нолон: COAOHC: 0 COAOC: 0 DC DUTY: 0.17 DC DEMAND: 0.17 ECC: 0 ECHC: 0 NSUCHC: 0.000176 NSUCC: 0.000467 0.000111 DDCCHC: DDCCC: 0.000294 NSC: 10900 DDCH: 32500 OPT: 305 CHWR: 17.5 CNWR: 0 OAR: 5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7450

BUILDING NAME: REGIMENTAL HQ BLDG

#### ENERGY CALCULATION SUMMARY

 System Type:
 1

 System Name:
 Small hot water boiler

 System Number:
 BLR-1

<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>	
0.00	1,634.87	0.00	
0.00	137.90	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	1,772.77	0.00	
0.00	0.00	0.00	-
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	2.55	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	-
			4.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         1,634.87           0.00         137.90           0.00         0.00           0.00         0.00           0.00         0.00           0.00         1,772.77           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         1,634.87         0.00           0.00         137.90         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         2.55           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	O	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

9,850

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7450	BUILDING NAME:	REGIMENTAL HQ BLDG
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**Building UA:** 2,563 CONDITIONED SQFT:

#### SYTEM INFORMATION ...

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU	ADMINISTRATION	0600-1700	M-F
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	30
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT		
	HR/YR	HR/YR		
CLG HRS ON:	1,100	3,360		
HTG HRS ON:	1,760	5,376		
H/C HRS ON:	2,868	8,760		
CLG HRS SAVED:	2,260			
HTG HRS SAVED:	3,616			
C/H HRS SAVED:	5,892			

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7450 BUILDING NAME: REGIMENTAL HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

<b>FUNCTION</b>	<u>kWiyr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	8,264.51	0.00	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	2.80	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	2.80	9,379.85	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	521.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	25.08	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.0
TOTAL	27.87	9,901.35	0.00	1 4.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
	TOTAL:	2	0	3	2	\$1,481.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001 **DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7450	<b>BUILDING NAME:</b>	REGIMENTAL HQ BLDG
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**Building UA:** 2,563 CONDITIONED SQFT: 9,850

#### SYMEMINEORMATION

System Type: 19

System Name: Fan coil unit

System Number: FC-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU		ADMINISTRATION	0600-1700	M-F
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	1.70
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	8,600
CFM-CLG:	8,600
%OA:	0%
%Area:	80%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

## HOURS CALCULATIONS

	HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	•
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	!

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001 DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7450

BUILDING NAME: REGIMENTAL HQ BLDG

#### ENERGY CALCULATION SUMMARY

System Type: 19
System Name: Fan coil unit
System Number: FC-1

FUNCTION:	kW/yr	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	9,340.52	0.00	m. + 1 - 1 m 2 m 2 Co. 2 m 2 m 2 m 2 m 2 m 2 m 2 m 2 m 2 m 2
Opt ST/SP	0.00	483.50	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	8,918.35	22.35	
Sub Total	0.00	18,742.37	22.35	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO	ÃO	T SUMMA  DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 7450 BUILDIN	IG NAME: REGIMENTAL HQ BLDG
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Building UA: 2,563 CONDITIONED SQFT: 9,850

#### SYTEM INFORMATION

System Type: 27
System Name: Perimeter radiation valve
System Number: RAD-1

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 2 BRICK AND CMU ADMINISTRATION 0600-1700 M-F Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	
HTG HRS SAVED:	3,616	
C/H HRS SAVED:	5,892	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000176
NSUCC:	0.000467
DDCCHC:	0.000111
DDCCC:	0.000294
NSC:	10900
DDCH:	32500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7450 BUILDING NAME: REGIMENTAL HQ BLDG

ENERGY CALCULATION SUMMARY

System Type: 27

System Name: Perimeter radiation valve

System Number: RAD-1

FUNCTION:	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/	<u>/</u> T
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	!			3.00
TOTAL	0.00	0.00	0.00	. 3.00

	TYPICAL SYSTEM	POINT A	AND COS	T SUMMA	<b>IRY</b>	
UMCS FUNCTN	UMCS APPLICATION	DO	AO	DI	ΑΙ	COST
NO.		POINTS	POINTS	POINTS	POINTS	
25	Optimum start/stop - Perimeter Rad Valve; Night setback - Perimeter	0	1	0	1	\$456.00
	Rad Valve					
	INAU VAIVE	a camaco co como transfer da 4,000,000 (000 aposta	v4 22"			5 f / \$ 1.2 Th 100 Th 10 to 10

## BUILDING 7485 BOWLING ALLEY

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7485	BUILDING NAME:	BOWLING ALLEY	
	Building UA:	6,305	CONDITIONED SQFT:	36,966

#### SYTEM INFORMATION

System Type: 18
System Name: Dual Duct air handling unit

System Number: AHU-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1	9 BRICK AND CMU		BOWLING ALLEY	0800-2400	M-F; SAT-SUN
Weeks of	Winter:	32	•		
Weeks of S	lummer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	12	9	9	9	9	9	9
REQ STOP:	22	24	24	24	24	2	2

<u>INPUTS</u>	
Motor HP:	20.00
HP Effic:	0.88
Load Factor:	0.80
CFM-HTG:	16,000
CFM-CLG:	16,000
%OA:	20%
%Area:	46%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,120	3,360
HTG HRS ON:	1,792	5,376
H/C HRS ON:	2,920	8,760
CLG HRS SAVED:	2,240	-
HTG HRS SAVED:	3,584	
C/H HRS SAVED:	5,840	<del>-</del> 

<u>CONSTANTS</u>	
HOAUHC:	22.3
HOAUH:	35.8
COAUHC:	0.000251
COAUC:	0.000665
HOAOHC:	25.5
HOAOH:	41
COAOHC:	0.000793
COAOC:	0.0021
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000076
ECHC:	0.0000287
NSUCHC:	0.000999
NSUCC:	0.00264
DDCCHC:	0.000147
DDCCC:	0.000389
NSC:	58000
DDCH:	60400
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW/AMS

BLDG: 7485 BUILDING NAME: BOWLING ALLEY

ENERGY CALCULATION SUMMARY

System Type: 18

System Name: Dual Duct air handling unit

System Number: AHU-1

FUNCTION	<u>kWlyr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	83,812.41	416.74	
Opt ST/SP	0.00	4,132.21	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	27.64	0.00	0.00	
Night Setback	0.00	93,346.56	168.22	
Sub Total	27.64	181,291.19	584.96	
Economizer	0.00	1,340.86	0.00	
Ventilation/Recirculation	0.00	244.98	21.76	
DDC Control	0.00	6,867.84	175.18	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00

	TYPICAL SYSTEM	I POINT A	ND COS	T SUMM/	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO- POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
28	Direct digital control - Dual Duct AHU	1	7	0	9	\$3,761.00
34	Outside air damper ventilation and recirculation control - Dual Duct AHU	0	1	0	0	\$272.00
37	Outside air damper economizer control - Dual Duct AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
48.496	TOTAL:	3	8	1	13	\$5,241.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7485	BUILDING NAME:	BOWLING ALLEY	
	Building UA:	6,305	CONDITIONED SQFT:	36,966

#### SYTEM INFORMATION .....

System Type: 11

System Name: Variable Air Volume air handling unit

System Number: AHU-2

Catagory Number:	Construction:	Use:	Occupancy HRS	: Occupancy Days:
1	9 BRICK AND CMU	BOWLING	ALLEY 0800-2400	M-F; SAT-SUN
Weeks of	Winter:	32	•	
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	12	9	9	9	9	9	9
REQ STOP:	22	24	24	24	24	2	2

10.00	Motor HP:
0.86	HP Effic:
0.80	Load Factor:
10,000	CFM-HTG:
10,000	CFM-CLG:
10%	%OA:
46%	%Area:
0	CHILLER CAP (TONS):
0.00	KW-TON:
0	BLR CAP INPUT (BTUH):
0	BLR CAP OUTPUT (BTUH):

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,120	3,360
HTG HRS ON:	1,792	5,376
H/C HRS ON:	2,920	8,760
CLG HRS SAVED:	2,240	
HTG HRS SAVED:	3,584	•
C/H HRS SAVED:	5,840	- 

OAUH: 35.8 AUHC: 0.000251 OAUC: 0.000665 AOHC: 25.5 OAOH: 41 AOHC: 0.000793 OAOC: 0.0021 DUTY: 0.17 MAND: 0.17	HOAUHC: HOAUH:
AUHC: 0.000251 OAUC: 0.000665 AOHC: 25.5 OAOH: 41 AOHC: 0.000793 OAOC: 0.0021 DUTY: 0.17 MAND: 0.17	HOAUH:
OAUC: 0.000665 AOHC: 25.5 OAOH: 41 AOHC: 0.000793 OAOC: 0.0021 DUTY: 0.17 MAND: 0.17	
AOHC: 25.5 OAOH: 41 AOHC: 0.000793 OAOC: 0.0021 DUTY: 0.17 MAND: 0.17	COAUHC:
OAOH: 41 AOHC: 0.000793 OAOC: 0.0021 DUTY: 0.17 MAND: 0.17	COAUC:
AOHC: 0.000793  OAOC: 0.0021  DUTY: 0.17  MAND: 0.17	HOAOHC:
OAOC:         0.0021           DUTY:         0.17           MAND:         0.17	нолон:
<b>DUTY:</b> 0.17 <b>MAND:</b> 0.17	COAOHC:
MAND: 0.17	COAOC:
	DC DUTY:
ECC: 0.000076	DC DEMAND:
<b>ECC.</b> 0.000070	ECC:
ECHC: 0.0000287	ECHC:
UCHC: 0.000999	NSUCHC:
SUCC: 0.00264	NSUCC:
CCHC: 0.000147	DDCCHC:
DCCC: 0.000389	DDCCC:
NSC: 58000	NSC:
DDCH: 60400	DDCH:
OPT: 305	OPT:
CHWR: 17.5	CHWR:
CNWR: 0	CNWR:
OAR: 5.67	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW/AMS

BLDG: 7485 BUILDING NAME: BOWLING ALLEY

ENERGY CALCULATION SUMMARY

System Type: 11
System Name: Variable Air Volume air handling unit

System Number: AHU-2

kW/yr	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
0.00	42,087.19	130.23	
0.00	2,121.49	0.00	
0.00	0.00	0.00	
14.19	0.00	0.00	
0.00	58,341.60	168.22	
14.19	102,550.28	298.45	
0.00	838.04	0.00	
0.00	76.55	6.80	
0.00	4,292.40	175.18	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			5.00
	0.00 0.00 0.00 14.19 0.00 14.19 0.00 0.00 0.00 0.00	0.00         42,087.19           0.00         2,121.49           0.00         0.00           14.19         0.00           0.00         58,341.60           14.19         102,550.28           0.00         838.04           0.00         76.55           0.00         4,292.40           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         42,087.19         130.23           0.00         2,121.49         0.00           0.00         0.00         0.00           14.19         0.00         0.00           0.00         58,341.60         168.22           14.19         102,550.28         298.45           0.00         838.04         0.00           0.00         76.55         6.80           0.00         4,292.40         175.18           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMM/	<b>\RY</b>	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
32	Direct digital control - VAV AHU	0	3	0	11	\$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	4	1	14	\$4,826.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7485	BUILDING NAME	: BOWLING ALLEY	
	Building UA:	6,305	CONDITIONED SQFT:	36,966

#### SYTEM INFORMATION

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	9 BRICK AND CMU		BOWLING ALLEY	0800-2400	M-F; SAT-SUN
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	12	9	9	9	9	9	9
REQ STOP:	22	24	24	24	24	2	2

INPUTS	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,000,000
BLR CAP OUTPUT (BTUH):	1,600,000

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,120	3,360
HTG HRS ON:	1,792	5,376
H/C HRS ON:	2,920	8,760
CLG HRS SAVED:	2,240	<del>-</del> I
HTG HRS SAVED:	3,584	<del>-</del>
C/H HRS SAVED:	5,840	

ANTS	
HOAUHC:	22.3
HOAUH:	35.8
COAUHC:	0.000251
COAUC:	0.00066
HOAOHC:	25.
НОАОН:	4
COAOHC:	0.000793
COAOC:	0.002
DC DUTY:	0.17
DC DEMAND:	0.1
ECC:	0.000076
ECHC:	0.0000287
NSUCHC:	0.00099
NSUCC:	0.0026
DDCCHC:	0.00014
DDCCC:	0.00038
NSC:	5800
DDCH:	6040
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW/AMS

BLDG: 7485

BUILDING NAME: BOWLING ALLEY ENERGY CALCULATION SUMMARY

System Type:

System Name: Small hot water boiler

System Number: BLR-1

<u>kW/yr</u>	<u>kWh/yr</u> -	MBtu/yr	<u>MH/yr</u>
0.00	8,122.52	0.00	2000
0.00	691.23	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	8,813.75	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	11.34	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
-			4.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         8,122.52           0.00         691.23           0.00         0.00           0.00         0.00           0.00         0.00           0.00         8,813.75           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         8,122.52         0.00           0.00         691.23         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         11.34           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	\RY	
FUNCTN NO.	UMCS APPLICATION	DO T POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	O	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG: 748	25	BUILDING	NAME: BOWLING ALLEY	
	Building UA:	6,305	CONDITIONED SQFT:	36,966
SYTEMINE	SEMATION :			

## SYTEM INFORMATION System Type: 8 System Name: Air cooled DX compressor System Number: CH-1

	Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
Wooks of Winter	1	9 BRICK AND CMU	BOWLING ALLEY	0800-2400	M-F; SAT-SUN
vveeks of vviiller.	Weeks of	Winter:	32		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	12	9	9	9	9	9	9
REQ STOP:	22	24	24	24	24	2	2

<u>inputs</u>	
Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	60
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,120	3,360
HTG HRS ON:	1,792	5,376
H/C HRS ON:	2,920	8,760
CLG HRS SAVED:	2,240	7
HTG HRS SAVED:	3,584	
C/H HRS SAVED:	5,840	1

22.3
35.8
000251
000665
25.5
41
000793
0.0021
0.17
0.17
000076
00287
000999
.00264
00147
00389
58000
60400
305
17.5
0
5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW/AMS

BLDG: 7485

BUILDING NAME: BOWLING ALLEY

ENERGY CALCULATION SUMMARY

System Type: 8

System Name: Air cooled DX compressor

System Number: CH-1

<u>FUNCTION</u>	<u>kWlyr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	1,050.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	50.49	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms	:		3.0
TOTAL	50.49	1,050.00	0.00 3.00

UMCS FUNCTN NO.	TYPICAL SYSTEN  UMCS APPLICATION	POINT A  DO  POINTS	ÀO	T SUMMA  DI POINTS	ARY AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	0	\$243.00
	TOTAL:	1	0	1	0	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW/AMS

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7485	BUILDING NAI	ME: BOWLING ALLEY	
	Building UA:	6,305	CONDITIONED SQFT:	36,966
SYTEM	INFORMATION			The Control of the Co
	System Type:	8		

SYTEM INFORMATION	
System Type:	8
System Name:	Air cooled DX compressor
System Number:	CH-2

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1	9 BRICK AND CMU		BOWLING ALLEY	0800-2400	M-F; SAT-SUN
Weeks of	Winter:	32	•		
Weeks of S	ummer:	20			

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: THUR: FRI: SAT: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 12 9 9 **REQ START:** 9 9 9 9 2 22 **REQ STOP:** 24 24

Motor HP:	0.00
HP Effic:	0.64
Load Factor:	0.80
CFM-HTG:	C
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	28
KW-TON:	1.10
BLR CAP INPUT (BTUH):	O
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,120	3,360
HTG HRS ON:	1,792	5,376
H/C HRS ON:	2,920	8,760
CLG HRS SAVED:	2,240	ì
HTG HRS SAVED:	3,584	-
C/H HRS SAVED:	5,840	-

•	<u>CONSTANTS</u>
22.3	HOAUHC:
35.8	HOAUH:
0.000251	COAUHC:
0.000665	COAUC:
25.5	HOAOHC:
41	HOAOH:
0.000793	COAOHC:
0.0021	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000076	ECC:
0.0000287	ECHC:
0.000999	NSUCHC:
0.00264	NSUCC:
0.000147	DDCCHC:
0.000389	DDCCC:
58000	NSC:
60400	DDCH:
305	OPT:
17.5	CHWR:
C	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW/AMS

BLDG: 7485 BUILDING NAME: BOWLING ALLEY

ENERGY CALCULATION SUMMARY

System Type: 8
System Name: Air cooled DX compressor

System Number: CH-2

FUNCTION -	kW/yr	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00	
Opt ST/SP	0.00	0.00	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	0.00	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	490.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	23.56	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	23.56	490.00	0.00	4 3.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
17	Scheduled start/stop control - DX Compressor; Optimum start/stop control - DX Compressor; Demand limiting - DX Compressor	1	0	1	O	\$243.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7485	BUILDING NAME:	BOWLING ALLEY	
	Building UA:	6,305	CONDITIONED SQFT:	36,966
			······································	

# SYTEM INFORMATION .....

BACHEMIN ZNMANON	
System Type:	21
System Name:	HW Unit heater
System Number:	UH-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1	9 BRICK AND CM	U	BOWLING ALLEY	0800-2400	M-F; SAT-SUN
Weeks of	Winter:	32	•		
Weeks of S	ummer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	12	9	9	9	9	9	9
REQ STOP:	22	24	24	24	24	2	2

<u>INPUTS</u>	
Motor HP:	0.25
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	0%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	HR/YR	PRESENT HR/YR
CLG HRS ON:	1,120	3,360
HTG HRS ON:	1,792	5,376
H/C HRS ON:	2,920	8,760
CLG HRS SAVED:	2,240	
HTG HRS SAVED:	3,584	
C/H HRS SAVED:	5,840	i

<u>CONSTANTS</u>	•
HOAUHC:	22.3
HOAUH:	35.8
COAUHC:	0.000251
COAUC:	0.000665
HOAOHC:	25.5
НОАОН:	41
COAOHC:	0.000793
COAOC:	0.0021
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000076
ECHC:	0.0000287
NSUCHC:	0.000999
NSUCC:	0.00264
DDCCHC:	0.000147
DDCCC:	0.000389
NSC:	58000
DDCH:	60400
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW/AMS

BUILDING NAME: BOWLING ALLEY BLDG: 7485 

ENERGY CALCULATION SUMMARY

System Type: 21

HW Unit heater System Name:

System Number: UH-1

<b>FUNCTION</b>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	822.67	0.00	214.14.34
Opt ST/SP	0.00	70.01	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	14.63	
Sub Total	0.00	892.68	14.63	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	-
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			/	0.0
TOTAL	0.00	892.68	14.63	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	AO POINTS	T SUMM/ DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1.	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7485	BUILDING NAME:	BOWLING ALLEY	
	Building UA:	6,305	CONDITIONED SQFT:	36,966

#### SYTEM INFORMATION ....

System Type: 21

System Name: HW Unit heater

System Number: UH-2

# TYPICAL BUILDING INFORMATION

Catagory Number: Construction:

19 BRICK AND CMU

Use: BOWLING ALLEY Occupancy HRS: 0800-2400

Occupancy Days: M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

00000000000000000000000000000000000000	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	12	9	9	9	9	9	9
REQ STOP:	22	24	24	24	24	2	2

<u>INPUTS</u>	
Motor HP:	0.25
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	1,630
CFM-CLG:	0
%OA:	0%
%Area:	4%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

## HOURS CALCULATIONS

	HR/YR	HR/YR
CLG HRS ON:	1,120	3,360
HTG HRS ON	1,792	5,376
H/C HRS ON	2,920	8,760
CLG HRS SAVED	2,240	-
HTG HRS SAVED	3,584	-
C/H HRS SAVED	5,840	•

	CONSTANTS
22.3	HOAUHC:
35.8	HOAUH:
0.00025	COAUHC:
0.00066	COAUC:
25.	HOAOHC:
4	НОАОН:
0.00079	COAOHC:
0.002	COAOC:
0.1	DC DUTY:
0.1	DC DEMAND:
0.00007	ECC:
0.000028	ECHC:
0.00099	NSUCHC:
0.0026	NSUCC:
0.00014	DDCCHC:
0.00038	DDCCC:
5800	NSC:
6040	DDCH:
30	OPT:
17.	CHWR:
	CNWR:
5.6	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW/AMS

BUILDING NAME: BOWLING ALLEY BLDG: 7485 

ENERGY CALCULATION SUMMARY

21 System Type: HW Unit heater System Name: UH-2 System Number:

<u>FUNCTION</u>	<u>kWlyr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	822.67	0.00
Opt ST/SP	0.00	70.01	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	14.63
Sub Total	0.00	892.68	14.63
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			0.0
TOTAL	0.00	892.68	14.63

UMES FUNCEN NO	TYPICAL SYSTEM  UMCS APPLICATION	DO	AO POINTS	T SUMM/ DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

# BUILDING 7500 VEHICLE MAINTENANCE SHOP ORG

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7500	BUILDING NAME:	VEH MNT SHOP ORG

**Building UA:** 9,707

**CONDITIONED SQFT:** 

22,325

#### SYZIEMINIZORMATIONS

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of Su	ımmer: 20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	. 24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

<u>inputs</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	2,600
CFM-CLG:	0
%OA:	15%
%Area:	7%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### REQUIRED PRESENT HR/YR HR/YR **CLG HRS ON:** 880 3,360 HTG HRS ON: 1.408 5,376 8,760 H/C HRS ON: 2,294 CLG HRS SAVED: 2,480 3,968 HTG HRS SAVED:

6,466

HOURS CALCULATIONS

C/H HRS SAVED:

and the second s	A PLOTED IN TO COME THE PROPERTY.
HOAUHC:	1
HOAUH:	(
COAUHC:	-
COAUC:	
HOAOHC:	
нолон:	
COAOHC:	
COAOC:	
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	
ECHC:	
NSUCHC:	0.00010
NSUCC:	0.00027
DDCCHC:	0.00016
DDCCC:	0.00042
NSC:	9430
DDCH:	4060
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 7500 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

AHU-1 System Number:

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	3,422.11	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	64.08	
Sub Total	0.00	3,685.15	64.08	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	27.59	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	- 0.00	3,685.15	91.66	3.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7	7500	BUILDING NAME: VEH MNT	SHOP ORG

Building UA: 9,707

CONDITIONED SQFT:

22,325

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

Catagory Number:	Constructio	n:	Use:	Occupancy HRS:	Occupancy Days:
	METAL PAN	EL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter:	32	•		
Weeks of Su	ımmer:	20			

# SYSTEM OPERATING SCHEDULE

7.539#10.000 http://www.new.new.new.new.new.new.new.new.new.	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

0.50	Motor HP:
0.66	HP Effic:
0.80	Load Factor:
1,800	CFM-HTG:
	CFM-CLG:
15%	%OA:
5%	%Area:
	CHILLER CAP (TONS):
0.00	KW-TON:
	BLR CAP INPUT (BTUH):
	BLR CAP OUTPUT (BTUH):

		PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	i
HTG HRS SAVED:	3,968	Ī.
C/H HRS SAVED:	6,466	j i

<u>ONSTANTS</u>	
HOAUHC:	
HOAUH:	
COAUHC:	
COAUC:	
HOAOHC:	
HOAOH:	
COAOHC:	
COAOC:	
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	
ECHC:	
NSUCHC:	0.00010
NSUCC:	0.00027
DDCCHC:	0.00016
DDCCC:	0.00042
NSC:	9430
DDCH:	4060
OPT:	30
CHWR:	17
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 7500 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	1,794.02	0.00
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	45.77
Sub Total	0.00	1,931.91	45.77
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	19.71
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.
TOTAL	0.00	1,931.91	65.47

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	(RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	O	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
<u>1</u>	TOTAL:	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG: 7500 BUILDING NAME: VEH MNT SHOP OR	BLDG:	7500	BUILDING NAME:	VEH MNT SHOP ORG	i
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**Building UA:** 9,707 CONDITIONED SQFT:

22,325

#### SYTEM INFORMATION ....

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction:

13 METAL PANEL AND CMU

Use: VEH MAINT SHOP

Occupancy HRS:

Occupancy Days:

0700-1800

Weeks of Winter: Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

0.50	Motor HP:
0.66	HP Effic:
0.80	Load Factor:
1,800	CFM-HTG:
0	CFM-CLG:
15%	%OA:
5%	%Area:
0	CHILLER CAP (TONS):
0.00	KW-TON:
0	BLR CAP INPUT (BTUH):
0	BLR CAP OUTPUT (BTUH):

#### HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	•
C/H HRS SAVED:	6,466	

#### <u>CONSTANTS</u>

	was some comment of the same o
0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	НОАОН:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0.000105	NSUCHC:
0.000278	NSUCC:
0.000161	DDCCHC:
0.000426	DDCCC:
94300	NSC:
40600	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7500 BUILDING NAME: VEH MNT SHOP ORG

## ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-3

<u>FUNCTION</u>	kW/yr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	1,794.02	0.00
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	45.77
Sub Total	0.00	1,931.91	45.77
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	19.71
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	1,931.91	65.47 3.00

UMCS UNCTN NO.	'UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7500	<b>BUILDING NAME:</b>	VEH MNT SHOP ORG

Building UA: 9,707 CONDITIONED SQFT: 22,325

#### SYTEM INFORMATION ....

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1	13 METAL PANEL AN	D CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	. 9	0.
REQ STOP:	0	18	18	18	15	18	0

# INPUTS

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	15%
%Агеа:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	-
HTG HRS SAVED:	3,968	•
C/H HRS SAVED:	6,466	•

#### CONSTANTS

	<u>CUNSTANTS</u>
0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	HOAOH:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0.000105	NSUCHC:
0.000278	NSUCC:
0.000161	DDCCHC:
0.000426	DDCCC:
94300	NSC:
40600	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 7500 BUILDING NAME: VEH MNT SHOP ORG

**ENERGY CALCULATION SUMMARY** 

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	45.77	
Sub Total	0.00	1,931.91	45.77	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	19.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	65.47	- 3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

DDEDARED

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

EMC NO: 1406-001

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7500 BUILDING NAME: VEH MNT SHOP ORG

Building UA: 9,707

CONDITIONED SQFT:

22,325

SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-5

TYPICAL BUILDIN	IG INFORMATION -			
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of W	Vinter: 32			
Weeks of Sur	nmer: 20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

<u>INPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	0
%OA:	15%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	- 
HTG HRS SAVED:	3,968	- :
C/H HRS SAVED:	6,466	-

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 7500

BUILDING NAME: VEH MNT SHOP ORG

## ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-5

FUNCTION .	- <u>kW/yr</u>	kWh/yr	MBtu/yr	- <u>MH/yr</u>
Schedule ST/SP	0.00	1,794.02	0.00	2000
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	54.92	
Sub Total	0.00	1,931.91	54.92	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	23.65	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001 DATE: 16-Sep-95

PREPARED BY: JM/AJN/AMS

22,325

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7500	BUILDING NAME: VEH MNT SHOP ORG

Building UA: 9,707 CONDITIONED SQFT:

SYTEM INFORMATION .....

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-6

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of \	Winter: 32			
Weeks of Su	ımmer: 20	)		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

<u>INPUTS</u>	
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	15%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

REQUIRED HR/YR	PRESENT HR/YR
880	3,360
1,408	5,376
2,294	8,760
2,480	•
3,968	
6,466	•
	880 1,408 2,294 2,480 3,968

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 7500 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-6

<b>EUNCTION</b>	kWlyr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	4,800.21	0.00
Opt ST/SP	0.00	368.97	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	119.00
Sub Total	0.00	5,169.18	119.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	51.23
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	5,169.18	170.23 3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO	AO	T SUMMA  DI POINTS	ARY AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

#### PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7500	<b>BUILDING NAME:</b>	VEH MNT SHOP ORG

Building UA: 9,707 CONDITIONED SQFT: 22,325

SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-1

#### TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:

14 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE ....

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	<u> </u>	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0,	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

0

Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0

#### HOURS CALCULATIONS

BLR CAP OUTPUT (BTUH):

		PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	-
C/H HRS SAVED:	6,466	•

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JM/AJN/AMS

BLDG: 7500 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit
System Number: MAU-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,538.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	31.45	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,538.79	31.45	* 3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7500	BUILDING NAME:	VEH MNT SHOP ORG

**Building UA:** 9,707 CONDITIONED SQFT: 22,325

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-2

## TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 14 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

SUN: MON: TUE: THUR: FRI: SAT: WED: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24. REQ START: 0 9 9 9 7 9 0 REQ STOP: 0 18 18 18 15 18 0

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

· ·		PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	· !
HTG HRS SAVED:	3,968	1
C/H HRS SAVED:	6,466	

	ONSTANTS
C	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	НОАОН:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0	NSUCHC:
0	NSUCC:
0.0000199	DDCCHC:
0.0000526	DDCCC:
0	NSC:
64800	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95 **PREPARED BY**: JM/AJN/AMS

BLDG: 7500 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-2

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	6,072.06	0.00
Opt ST/SP	0.00	466.73	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	6,538.79	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	31.45
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	6,538.79	31.45 3.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMM/	ARY.	
UMCS FUNCIN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
	TOTAL:	1	2	0	4	\$1,433.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

TREFAREDOT. ON

# **ENERGY CALCULATION PARAMETERS**

**BLDG: 7500 BUILDING NAME:** VEH MNT SHOP ORG

Building UA: 9,707 CONDITIONED SQFT: 22,325

SYTEMMINEORNATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-3

		••	Visit 18894 - 212 - 212	
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	4 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32	•		
Weeks of S	ummer: 20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	. 0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

<u>INPUTS</u>	
Motor HP:	7.50
HP Effic:	0.83
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

HR/YR	HR/YR
880	3,360
1,408	5,376
2,294	8,760
2,480	-    -
3,968	• •
6,466	
	880 1,408 2,294 2,480 3,968

	<u>ONSTANTS</u>
0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	нолон:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0	NSUCHC:
0	NSUCC:
0.0000199	DDCCHC:
0.0000526	DDCCC:
0	NSC:
64800	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JM/AJN/AMS

BLDG: 7500 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-3

FUNCTION	kW/yr	kWh/yr	MBtulyr MH/yr
Schedule ST/SP	0.00	21,372.77	0.00:
Opt ST/SP	0.00	1,642.82	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	23,015.58	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	62.90
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.00	23,015.58	62.90 * 3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95 PREPARED BY: JM/AJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7500	•	<b>BUILDING NAME:</b>	VEH MNT SHOP ORG
DEDO.	7 300		DOILDING NAME.	VEH WINT SHOP ONG

Building UA: 9,707 CONDITIONED SQFT:

22,325

#### SYTEM INFORMATION ...

System Type: 20

System Name: Infrared Radiant Heaters

System Number: RAD-1

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Occupancy HRS: Occupancy Days: 13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F Weeks of Winter: 32

#### SYSTEM OPERATING SCHEDULE

Weeks of Summer:

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

20

<u>INPUIS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	5 
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	e P

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	_ 0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: JM/AJN/AMS

**DATE**: 16-Sep-95

BUILDING NAME: VEH MNT SHOP ORG

#### ENERGY CALCULATION SUMMARY

System Type: 20

BLDG: 7500

System Name: Infrared Radiant Heaters

System Number: RAD-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	219.69	
Sub Total	0.00	1,931.91	219.69	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.0
TOTAL	0.00	1,931.91	219.69	) · · · · · · · · · · · · · · · · · · ·

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AND COS AO POINTS	T SUMMA  DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7500	BUILDING NAME:	VEH MNT SHOP ORG	
	Building UA:	9,707	CONDITIONED SQFT:	22,325

#### SYTEM INFORMATION ....

System Type: 20

System Name: Infrared Radiant Heaters

System Number: RAD-2

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

<u>INPUTS</u>	
Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	•
C/H HRS SAVED:	6,466	•

<u>ONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JM/AJN/AMS

BLDG: 7500

BUILDING NAME: VEH MNT SHOP ORG

#### ENERGY CALCULATION SUMMARY

System Type: 20
System Name: Infrared Radiant Heaters
System Number: RAD-2

FUNCTION -	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,202.27	0.00	<u> </u>
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	146.46	
Sub Total	0.00	1,294.68	146.46	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.00
TOTAL	0.00	1,294.68	146.46	0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO  POINTS	AO	ĎI	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

# BUILDING 7520 VEHICLE MAINTENANCE SHOP ORG

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMS

**DATE:** 16-Sep-95

**ENERGY CALCULATION PARAMETERS** 

BLDG:	7520	BUILI	DING NAME:	VEH MNT SHOP ORG	<u>-</u>
	Building UA:	11,789		CONDITIONED SQFT:	27,112
SYTEM	INFORMATION				
	System Type:	15			W. 1000.
	System Name:	Small Single Zone air hand	lling unit		
	System Number:	AHU-1			

Catagory Number:	Construction		Use:	Occupancy HRS:	Occupancy Days
13	METAL PANE	L AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter:	32			
Weeks of Su	ummer:	20			

#### SYSTEM OPERATING SCHEDULE SUN: MON: TUE: WED: FRI: SAT: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 9. **REQ START:** 0 9 9 7 9 0 **REQ STOP:** 0 18 18 18 15 18 0

1.00	Motor HP:
0.69	HP Effic:
0.80	Load Factor:
2,600	CFM-HTG:
0	CFM-CLG:
30%	%OA:
7%	%Area:
0	CHILLER CAP (TONS):
0.00	KW-TON:
0	BLR CAP INPUT (BTUH):
0	BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	•
C/H HRS SAVED:	6,466	•

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JMAJN/AMS

BLDG: 7520 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
0.00	3,422.11	0.00	
0.00	263.04	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	77.82	
0.00	3,685.15	77.82	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	33.50	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
	:		3.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         3,422.11           0.00         263.04           0.00         0.00           0.00         0.00           0.00         0.00           0.00         3,685.15           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         3,422.11         0.00           0.00         263.04         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         77.82           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

TYPICAL SYSTEM POINT AND COST SUMMARY  UMCS							
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST	
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00	
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00	
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00	
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00	
	control - AHU TOTAL:	1	3	0	6	\$2,116.00	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JMAJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7520	BUILDING NAME:	VEH MNT SHOP ORG	
	Building UA:	11,789	CONDITIONED SQFT:	27,112

#### SYTEM INFORMATION

System Type: 15 System Name: Small Single Zone air handling unit System Number: AHU-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of \	Winter: 32			
Weeks of Su	ımmer: 20			

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

Motor HP:	0.50
MOTOL UP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	30%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	- )
HTG HRS SAVED:	3,968	<u>.</u>
C/H HRS SAVED:	6,466	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMS

BLDG: 7520

BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	•
Night Setback	0.00	0.00	55.59	
Sub Total	0.00	1,931.91	55.59	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	23.93	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	1,931.91	79.52	3.00

JMCS JNCTN NO.	UMCS APPLICATION	DO . POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

3

EMC NO: 1406-001

**CLIENT CNTRCT #:** DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMS

**DATE**: 16-Sep-95

**ENERGY CALCULATION PARAMETERS** 

BLDG:	7520	BUILDING NAME	: VEH MNT SHOP ORG	
	Building UA:	11,789	CONDITIONED SQFT:	27,112
SV-T-V				

SYTEMINFORMATION	
System Type:	15
System Name:	Small Single Zone air handling unit
System Number:	AHU-3

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1;	METAL PANEL	AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	. 0

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	30%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	- !
HTG HRS SAVED:	3,968	1
C/H HRS SAVED:	6,466	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
ноаон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JMAJN/AMS

BUILDING NAME: VEH MNT SHOP ORG BLDG: 7520 

# ENERGY CALCULATION SUMMARY

15 System Type: System Name: Small Single Zone air handling unit AHU-3 System Number:

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	MH/yr
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	55.59	
Sub Total	0.00	1,931.91	55.59	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	23.93	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:		3.00
TOTAL	0.00	1,931.91	79.52	, 3.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JMAJN/AMS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7520	<b>BUILDING NAME:</b>	VEH MNT SHOP ORG
BLDG:	7520	BUILDING NAME:	VEH MNT SHOP

Building UA: 11,789 CONDITIONED SQFT: 27,112

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

#### TYPICAL BUILDING INFORMATION

Catagory Number: Con	struction:	Use:	Occupancy HRS:	Occupancy Days:
13 MET	AL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F

Weeks of Winter: 32
Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	. 0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

#### <u>INPUTS</u>

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	1,800
CFM-CLG:	0
%OA:	30%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS

REQUIRED HR/YR	PRESENT HR/YR
880	3,360
1,408	5,376
2,294	8,760
2,480	-
3,968	-
6,466	
	HR/YR 880 1,408 2,294 2,480 3,968

#### CONSTANTS

	ZORO (ARTIO
0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	НОАОН:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0.000105	NSUCHC:
0.000278	NSUCC:
0.000161	DDCCHC:
0.000426	DDCCC:
94300	NSC:
40600	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JMAJN/AMS

BLDG: 7520 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

FUNCTION -	<u>kW/yr</u>	kWh/yr	MBtu/yr 1	<u>AH/yr</u>
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	55.59	
Sub Total	0.00	1,931.91	55.59	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	23.93	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:		3.00
and Safety Alarms TOTAL	0.00	(1,931,91	79.52	3.0

UMCS = UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JMAJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG: 7520 BUILDING NAME: VEH MNT SHOP ORG

Building UA: 11,789

CONDITIONED SQFT:

27,112

SYTEM NEORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-5

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of St	ımmer: 20			

SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	. 0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

<u>INPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	2,200
CFM-CLG:	ō
%OA:	30%
%Area:	6%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

HOURS CAL	CULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	-
HTG HRS SAVED:	3,968	·
C/H HRS SAVED:	6,466	

HOAUHC:	
	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: JMAJN/AMS

BLDG: 7520 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-5

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr
Schedule ST/SP	0.00	1,794.02	0.00
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	66.70
Sub Total	0.00	1,931.91	66.70
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	28.72
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
"TOTAL	0.00	1,931.91	95.42 3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMS

### **ENERGY CALCULATION PARAMETERS**

BLDG:	7520	<b>BUILDING NAME:</b>	VEH MNT SHOP ORG

**Building UA:** CONDITIONED SQFT: 11,789 27,112

## SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-6

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 13 METAL PANEL AND CMU VEH MAINT SHOP 0700-1800 M-F

Weeks of Winter: Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

<u>inputs</u>	A CONTRACTOR OF THE CONTRACTOR
Motor HP:	1.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	4,600
CFM-CLG:	0
%OA:	30%
%Area:	13%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	I
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	-

	CONSTANTS
C	HOAUHC:
C	HOAUH:
C	COAUHC:
C	COAUC:
C	HOAOHC:
C	нолон:
C	COAOHC:
C	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
C	ECC:
C	ECHC:
0.000105	NSUCHC:
0.000278	NSUCC:
0.000161	DDCCHC:
0.000426	DDCCC:
94300	NSC:
40600	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

**DATE**: 16-Sep-95 PREPARED BY: JMAJN/AMS

BLDG: 7520

BUILDING NAME: VEH MNT SHOP ORG

#### ENERGY CALCULATION SUMMARY

15 System Type: System Name: Small Single Zone air handling unit

System Number: AHU-6

<u>FUNCTION</u>	kW/yr	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	4,800.21	0.00	
Opt ST/SP	0.00	368.97	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	144.52	
Sub Total	0.00	5,169.18	144.52	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	62.22	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	5,169,18	206.74	3.00

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	\RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7520	BUILDING NAME:	VEH MNT SHOP ORG

Building UA: 11,789 CONDITIONED SQFT:

27,112

SYTEM INFORMATION :

System Type: 16 System Name: Heating and Ventilating Unit System Number: MAU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	4 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of S	ummer: 20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0.	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	- <b>)</b>
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	i i

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMS

BUILDING NAME: VEH MNT SHOP ORG BLDG: 7520

## ENERGY CALCULATION SUMMARY

System Type:

Heating and Ventilating Unit System Name:

System Number: MAU-1

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	6,072.06	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00,	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	6,538.79	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	38.20	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	6,538.79	38.20	3.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AJ POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: JMAJN/AMS

Occupancy Days:

M-F

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7520	BUILDING NAME:	VEH MNT SHOP ORG
·			

**Building UA:** 11,789

CONDITIONED SQFT: 27,112

#### SYTEM INFORMATION

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-2

#### TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: VEH MAINT SHOP 14 METAL PANEL AND CMU 0700-1800

Weeks of Winter: 32 Weeks of Summer: 20

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

M-4	0.00
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	4,120
CFM-CLG:	0
%OA:	100%
%Area:	5%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	•
HTG HRS SAVED:	3,968	-
C/H HRS SAVED:	6,466	1

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	. 0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.0000199
DDCCC:	0.0000526
NSC:	0
DDCH:	64800
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: JMAJN/AMS

BLDG: 7520

BUILDING NAME: VEH MNT SHOP ORG

## ENERGY CALCULATION SUMMARY

System Type: 16

System Name: Heating and Ventilating Unit

System Number: MAU-2

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
0.00	6,072.06	0.00	to the second se
0.00	466.73	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	6,538.79	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	38.20	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         6,072.06           0.00         466.73           0.00         0.00           0.00         0.00           0.00         0.00           0.00         6,538.79           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         6,072.06         0.00           0.00         466.73         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         38.20           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
	TOTAL:	1	2	0	4	\$1,433.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMS

## **ENERGY CALCULATION PARAMETERS**

ı	BLDG: 7520	BUILDING NAME	E: VEH MNT SHOP ORG	
	Building UA:	11,789	CONDITIONED SQFT:	27,112

#### SYTEM INFORMATION

System Type:	16
System Name:	Heating and Ventilating Unit
System Number:	MAU-3

TYPICAL BUILDI	NG INFORMATION		425	
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
14	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32	•		
Weeks of St	ummer: 20			

### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0.

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	12,200
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	- r
HTG HRS SAVED:	3,968	ř
C/H HRS SAVED:	6,466	

	ONSTANTS
	HOAUHC:
(	HOAUH:
	COAUHC:
(	COAUC:
(	HOAOHC:
(	НОАОН:
	COAOHC:
	COAOC:
0.1	DC DUTY:
0.1	DC DEMAND:
(	ECC:
	ECHC:
	NSUCHC:
(	NSUCC:
0.0000199	DDCCHC:
0.0000526	DDCCC:
(	NSC:
64800	DDCH:
309	OPT:
17.5	CHWR:
	CNWR:
5.6	OAR:

System Number:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

MAU-3

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMS

BUILDING NAME: VEH MNT SHOP ORG BLDG: 7520 ENERGY CALCULATION SUMMARY System Type: System Name: Heating and Ventilating Unit

<u>kW/yr</u>	kWh/yr,	MBtu/yr MH/yr
0.00	14,510.43	0.00
0.00	1,115.34	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	15,625.77	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	76.39
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		3.0
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	0.00         14,510.43           0.00         1,115.34           0.00         0.00           0.00         0.00           0.00         0.00           0.00         15,625.77           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95 PREPARED BY: JMAJN/AMS

LOCATION: FT. RILEY, KS **ENERGY CALCULATION PARAMETERS** 

BLDG:	7520	BUILDING NAME:	VEH MNT SHOP ORG
	7020	DOILDING NAME.	AFLI MIMI SUCE OVO

BLDG.	7520	BUILD	ING NAME:	VEH MINT SHOP ORG	
	Building UA:	11,789		CONDITIONED SQFT:	27,112

## SYTEM INFORMATION System Type: 20

System Name: Infrared Radiant Heaters

System Number: RAD-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
1	3 METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of S	ummer: 20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	9	. 9	9	7	9	0
REQ STOP:	0	18	18	18	15	18	0

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	24%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	
C/H HRS SAVED:	6,466	

	sealenners (Lingston (d.J.).
HOAUHC:	
HOAUH:	
COAUHC:	
COAUC:	
HOAOHC:	
НОАОН:	
COAOHC:	
COAOC:	<del></del>
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	
ECHC:	
NSUCHC:	0.00010
NSUCC:	0.00027
DDCCHC:	0.00016
DDCCC:	0.00042
NSC:	9430
DDCH:	4060
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS PREPARED BY: JMAJN/AMS

BLDG: 7520 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 20

System Name: Infrared Radiant Heaters

System Number: RAD-1

FUNCTION: -	<u>kWlyr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	1,794.02	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	266.81	
Sub Total	0.00	1,931.91	266.81	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.0
TOTAL	0.00	1,931.91	266.81	0.0

UMCS	TYPICAL SYSTEM	POINT	IND COS	T SUMMA	(RY	
FUNCTA NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	0	1	2	\$1,213.00
	TOTAL:		0	1	2	\$1,213.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**DATE**: 16-Sep-95

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMS

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7520	BUILDING NAME:	VEH MNT SHOP ORG	
	Building UA:	11,789	CONDITIONED SQFT:	27,112

SYTEM INFORMATION		4000
System Type:	20	!
System Name:	Infrared Radiant Heaters	
System Number:	RAD-2	į

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
13	METAL PANEL AND CMU	VEH MAINT SHOP	0700-1800	M-F
Weeks of	Winter: 32			
Weeks of Si	ımmer: 20			

SYSTEM OPERA	TING S	CHEDU	LE :					
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:	one to the second of the secon
PRES START:	0	0	0	0	0	0	0	
PRES STOP:	24	24	24	24	24	24	24	
REQ START:	0	9	9	9	7	9	0	
REQ STOP:	0	18	18	18	15	18	0	

Motor HP:	0.33
HP Effic:	0.65
Load Factor:	0.80
CFM-HTG:	(
CFM-CLG:	(
%OA:	0%
%Area:	16%
CHILLER CAP (TONS):	(
KW-TON:	0.00
BLR CAP INPUT (BTUH):	(
BLR CAP OUTPUT (BTUH):	

IOURS CALCULAT	<u>ions</u>	
	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	880	3,360
HTG HRS ON:	1,408	5,376
H/C HRS ON:	2,294	8,760
CLG HRS SAVED:	2,480	
HTG HRS SAVED:	3,968	<b>3</b> .
C/H HRS SAVED:	6,466	5

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000105
NSUCC:	0.000278
DDCCHC:	0.000161
DDCCC:	0.000426
NSC:	94300
DDCH:	40600
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: JMAJN/AMS

BLDG: 7520 BUILDING NAME: VEH MNT SHOP ORG

ENERGY CALCULATION SUMMARY

System Type: 20

System Name: Infrared Radiant Heaters

System Number: RAD-2

FUNCTION :	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	1,202.27	0.00	
Opt ST/SP	0.00	92.41	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	177.87	
Sub Total	0.00	1,294.68	177.87	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				0.0
TOTAL	0.00	1,294.68	177.87	0.0

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	AND COS AO POINTS	T SUMMA DI POINTS	ARY AI POINTS	COST
20	Scheduled start/stop control - Unitary Equip; Optimum start/stop - Unitary Equip; Night setback - Unitary Equip	1	O	1	2	\$1,213.00
	TOTAL:	1	0	1	2	\$1,213.00

## BUILDING 7602 ADMINISTRATION & SUPPLY BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

#### DADAMETERS

ENERGY	CALCULA	NOITA	PARAMETERS
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BLDG: 7602 BUILDIN	G NAME: ADMIN & SUPPORT BLDG
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Building UA:

4,753

CONDITIONED SQFT:

13.520

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

## TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32		
Weeks of S	Summer:	20		

## SYSTEM OPERATING SCHEDULE

100,yy 110	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	3 !
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	<del>.</del> '.

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7602

BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: System Name: 15

Small Single Zone air handling unit

System Number:

AHU-1

<u>FUNCTION</u>	kW/yr	kWh/yr 1	//Btu/yr	MH/yr
Schedule ST/SP	0.00	1,067.01	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.35	0.00	0.00	
Night Setback	0.00	1,326.60	0.00	
Sub Total	0.35	2,531.51	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	46.81	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	4 0.35	2,578.32	0.00	3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95 PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7602	BUILDING NAME:	ADMIN & SUPPORT BLDG

**Building UA:** 4,753 CONDITIONED SQFT:

13,520

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

## TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks o	of Winter:	32		
Weeks of	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

time at the factor of the control of the	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

#### **INPUTS** 0.50 Motor HP: HP Effic: 0.66 0.80 Load Factor: CFM-HTG: 0 940 CFM-CLG: %OA: 20% %Area: 0% CHILLER CAP (TONS): 0 0.00 KW-TON: **BLR CAP INPUT (BTUH):** 0 BLR CAP OUTPUT (BTUH): 0

		PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON	1,600	5,376
H/C HRS ON	2,607	8,760
CLG HRS SAVED	2,360	; !
HTG HRS SAVED	3,776	-
C/H HRS SAVED	6,153	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #:** DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

**BUILDING NAME: ADMIN & SUPPORT BLDG** 

ENERGY CALCULATION SUMMARY

System Type: 15

BLDG: 7602

System Name: Small Single Zone air handling unit

System Number: AHU-2

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr M	Btu/yr MH/yr	•
Schedule ST/SP	0.00	1,067.01	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.35	0.00	0.00	
Night Setback	0.00	1,326.60	0.00	
Sub Total	0.35	2,531.51	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	46.81	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
•	0.35	2,578.32	0.00	

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	. 0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

### **ENERGY CALCULATION PARAMETERS**

BLDG:	7602	BUILDING NAME:	ADMIN & SUPPORT BLDG	
	Building UA:	4,753	CONDITIONED SQFT:	13

**Building UA:** 4,753 13,520

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

## TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32		
Weeks of S		20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	3 
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	-

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
. ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7602

BUILDING NAME: ADMIN & SUPPORT BLDG

#### **ENERGY CALCULATION SUMMARY**

System Type:

15

System Name:

Small Single Zone air handling unit

System Number:

AHU-3

		Btu/yr 1	AH/yr
0.00	1,067.01	0.00	
0.00	137.90	0.00	
0.00	0.00	0.00	
0.35	0.00	0.00	
0.00	1,326.60	0.00	
0.35	2,531.51	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	46.81	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.0
	0.00 0.00 0.35 0.00 0.35 0.00 0.00 0.00	0.00     137.90       0.00     0.00       0.35     0.00       0.00     1,326.60       0.35     2,531.51       0.00     0.00       0.00     0.00       0.00     46.81       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00       0.00     0.00	0.00         137.90         0.00           0.00         0.00         0.00           0.35         0.00         0.00           0.00         1,326.60         0.00           0.35         2,531.51         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         46.81         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

TYPICAL SYSTEM POINT AND COST SUMMARY UMCS							
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST	
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00	
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00	
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00	
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00	
	TOTAL:	1	3	0		\$2,116.00	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7602	BUILDING NAME:	ADMIN & SUPPORT BLDG	
	Building UA:	4.753	CONDITIONED SQFT:	13.520

#### SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7.	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>			
Motor HP:	0.50		
HP Effic:	0.66		
Load Factor:	0.80		
CFM-HTG:	0		
CFM-CLG:	940		
%OA:	20%		
%Area:	0%		
CHILLER CAP (TONS):	0		
KW-TON:	0.00		
BLR CAP INPUT (BTUH):	0		
BLR CAP OUTPUT (BTUH):	0		

REQUIRED HR/YR	PRESENT HR/YR
1,000	3,360
1,600	5,376
2,607	8,760
2,360	
3,776	
6,153	1
	1,000 1,600 2,607 2,360 3,776

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7602

BUILDING NAME: ADMIN & SUPPORT BLDG

## **ENERGY CALCULATION SUMMARY**

System Type: 15

System Name:

Small Single Zone air handling unit

System Number:

AHU-4

FUNCTION	kW/yr	<u>kWh/yr</u> <u>N</u>	lBtu/yr	MH/yr
Schedule ST/SP	0.00	1,067.01	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.35	0.00	0.00	
Night Setback	0.00	1,326.60	0.00	
Sub Total	0.35	2,531.51	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	46.81	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.35	2,578.32	0.00	3.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**EMC NO**: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

**DATE**: 16-Sep-95

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7602	BUILDING NAME:	ADMIN & SUPPORT BLDG	
	Building UA:	4,753	CONDITIONED SQFT:	13,520

## SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-5

#### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks	of Winter:	32			
Weeks of	Summer:	20			

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	. 0	0	0	0	. 0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	. 7	7	. 7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		PRESENT HR/YR
CLG HRS ON	: 1,000	3,360
HTG HRS ON	: 1,600	5,376
H/C HRS ON	2,607	8,760
CLG HRS SAVED	2,360	•
HTG HRS SAVED	3,776	
C/H HRS SAVED	6,153	•

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
ноаон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7602

BUILDING NAME: ADMIN & SUPPORT BLDG

## ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Sma

Small Single Zone air handling unit

System Number: AHU-5

FUNCTION	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	1,067.01	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.35	0.00	0.00	
Night Setback	0.00	1,326.60	0.00	
Sub Total	0.35	2,531.51	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	46.81	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:		3.0
TOTAL	0.35	2,578.32	0.00	3.0

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7602	BUILDING NA	ME: ADMIN & SUPPORT BLDG	
	Building UA:	4,753	CONDITIONED SQFT:	13,520
SYTEM	INFORMATION			
<u> </u>	System Type: 1			
	System Name: Small ho	t water boiler		

BUILDIN	

System Number: BLR-1

TYPICAL BUILI	DING INFORMATIO	<u>N</u>			
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks	of Winter:	32			
Weeks of	Summer:	20			

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,000,000
BLR CAP OUTPUT (BTUH):	800,000

		PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	<u>.</u>
HTG HRS SAVED:	3,776	
C/H HRS SAVED:	6,153	Ī

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
ноаон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
. ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7602

BUILDING NAME: ADMIN & SUPPORT BLDG

## ENERGY CALCULATION SUMMARY

System Type:

System Name: Small hot water boiler

System Number: BLR-1

		Btu/yr MH/	λι
0.00	.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	5.67	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			4.00
	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00	0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         5.67           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001 **DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

#### **ENERGY CALCULATION PARAMETERS**

BLDG:	7602	BUILDING NAME:	ADMIN & SUPPORT BLDG

4,753 **Building UA:** CONDITIONED SQFT: 13,520

#### SYTEM INFORMATION

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks o	of Winter:	32			
Weeks of	Summer:	20			

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	. 0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	17	17	17	17	17	0

INPUTS	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	15
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	<del></del>	PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	 !
HTG HRS SAVED:	3,776	; ;
C/H HRS SAVED:	6,153	

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
нолонс:	0
HOAOH:	0
солонс:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7602

BUILDING NAME: ADMIN & SUPPORT BLDG

#### **ENERGY CALCULATION SUMMARY**

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr Mi	H/yr
Schedule ST/SP	0.00	2,035.33	0.00	
Opt ST/SP	0.00	263.04	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.66	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.66	2,298.37	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	262.50	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	12.62	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:		4.00
TOTAL	13.28	2,560.87	0.00	4.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	POINT A  DO POINTS	ND COST	<b>DI</b>	ARY AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00
	TOTAL:	2	0	3.	2	\$1,481.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG: 7602 BUILDING NAME: ADMIN & SUPPORT BLDG

> CONDITIONED SQFT: **Building UA:** 4,753

13,520

#### SYTEM INFORMATION

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

### TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks o	of Winter:	32			
Weeks of	Summer:	20			

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	. 0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7.	7	7	7	0
REQ STOP:	0	17	17	17	17	17	. 0

<u>INPUTS</u>	
Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

		PRESENT HR/YR
CLG HRS ON:	1,000	3,360
HTG HRS ON:	1,600	5,376
H/C HRS ON:	2,607	8,760
CLG HRS SAVED:	2,360	1
HTG HRS SAVED:	3,776	1
C/H HRS SAVED:	6,153	

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7602

BUILDING NAME: ADMIN & SUPPORT BLDG

# ENERGY CALCULATION SUMMARY

System Type:

25

System Name:

Hot water radiation pump

System Number:

RAD-1

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,560.81	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	2,767.66	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			:	3.00
TOTAL	0.00	2,767.66	0.00	3.00

UMCS FUNCTN NO.	TYPICAL SYSTEN  UMCS APPLICATION	POINT A  DO  POINTS	AND COST AO POINTS	Dì	RY AI POINTS	COST
23	Scheduled start/stop control - HW Pump; Optimum start/stop - HW Pump; Night setback - HW Pump	1	0	1	1	\$570.00
	TOTAL:	1	0	1	1	\$570.00

## BUILDING 7604 GENERAL INSTRUCTION BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

Duitding HA.	2 640	CONDITIONED COET.
BLDG: 7604	BUILDING NAME:	GEN INST BLDG

Building UA: 3,640 COM

CONDITIONED SQFT: 13,493

## SYTEMINFORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	1 BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0.	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	. 24
REQ START:	0	7	7	7	7	7.	0
REQ STOP:	0	23	23	23	23	15	0

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	6,000
CFM-CLG:	6,000
%OA:	15%
%Area:	45%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	1,440	3,360
HTG HRS ON:	2,304	5,376
H/C HRS ON:	3,754	8,760
CLG HRS SAVED:	1,920	Ī
HTG HRS SAVED:	3,072	•
C/H HRS SAVED:	5,006	-

<u>CONSTANTS</u>	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	. 0
COAUC:	0
нолонс:	17.3
нолон:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7604 BUILDING NAME: GEN INST BLDG

ENERGY CALCULATION SUMMARY

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-1

FUNCTION	kW/yr	<u>kWh/yr</u>	MBtu/yr MH/yr	
Schedule ST/SP	0.00	18,305.21	95.06	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	6,637.58	49.96	
Sub Total	7.46	26,058.13	145.02	
Economizer	0.00	1,766.02	0.00	
Ventilation/Recirculation	0.00	0.00	5.79	
DDC Control	0.00	2,070.11	52.25	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.0
TOTAL	7.46	29,894.26	203.06	5.0

	TYPICAL SYSTEM	POINT A	ND COS	TSUMMA	(RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	ÁI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	8	1	11	\$4,509.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

## **ENERGY CALCULATION PARAMETERS**

BLDG:	7604		G NAME: GEN INST BLDG	
	Building UA:	3,640	CONDITIONED SQFT: 13,4	493

#### SYTEM INFORMATION

System Type: 10

System Name: Multizone air handling unit

System Number: AHU-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
21	BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32		
Weeks of Su	ımmer:	20		

#### SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	. 0	23	23	23	23	15	0

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	6,000
CFM-CLG:	6,000
%OA:	15%
%Area:	45%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,440	3,360
HTG HRS ON:	2,304	5,376
H/C HRS ON:	3,754	8,760
CLG HRS SAVED:	1,920	
HTG HRS SAVED:	3,072	
C/H HRS SAVED:	5,006	

CONSTANTS	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
НОАОН:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

BLDG: 7604

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

PREPARED BY: AJN/CWW

**DATE**: 16-Sep-95

BUILDING NAME: GEN INST BLDG

ENERGY CALCULATION SUMMARY

System Type: 10
System Name: Multizone air handling unit

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	18,305.21	95.06	
Opt ST/SP	0.00	1,115.34	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	7.46	0.00	0.00	
Night Setback	0.00	6,637.58	49.96	
Sub Total	7.46	26,058.13	145.02	
Economizer	0.00	1,766.02	0.00	
Ventilation/Recirculation	0.00	0.00	5.79	
DDC Control	0.00	2,070.11	52.25	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				5.00
TOTAL	7.46	29,894.26	203.06	, 5.00

UMCS UNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO POINTS	ÃO POINTS	DI	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
29	Direct digital control - MZ AHU	0	7	0	8	\$3,378.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
35	Outside air damper economizer control - MZ AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7604	BUILDING N	IAME: GEN INST BLDG	
Building UA:	3,640	CONDITIONED SQFT:	13,493
SYTEMINEORMATION			
System Type: 15			
System Name: Small Sin	gle Zone air handling uni	t	

over the state of	INGINEORMATIC	N <sup>-1</sup>		e de la companya de la companya de la companya de la companya de la companya de la companya de la companya de
Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	21 BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	f Winter:	32		
Weeks of S	Summer:	20		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7.	7	7	7	0
REQ STOP:	0	23	23	23	23	15	0

<u>INPUTS</u>	
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	2,000
CFM-CLG:	2,000
%OA:	15%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,440	3,360
HTG HRS ON:	2,304	5,376
H/C HRS ON:	3,754	8,760
CLG HRS SAVED:	1,920	
HTG HRS SAVED:	3,072	1
C/H HRS SAVED:	5,006	

CONSTANTS	
HOAUHC:	21.1
HOAUH:	34
COAUHC:	0
COAUC:	0
HOAOHC:	17.3
НОАОН:	27.9
COAOHC:	0.000885
COAOC:	0.00234
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000207
ECHC:	0.0000784
NSUCHC:	0.000221
NSUCC:	0.000584
DDCCHC:	0.0000919
DDCC:	0.000243
NSC:	30500
DDCH:	31900
OPT:	31900
CHWR:	· · · · · · · · · · · · · · · · · · ·
	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7604 BUILDING NAME: GEN INST BLDG

# ENERGY CALCULATION SUMMARY

System Type: 15
System Name: Small Single Zone air handling unit
System Number: AHU-3

<b>FUNCTION</b>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	7,660.03	31.69	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	3.12	0.00	0.00	
Night Setback	0.00	2,212.53	11.10	
Sub Total	3.12	10,339.28	42.79	
Economizer	0.00	588.67	0.00	
Ventilation/Recirculation	0.00	0.00	1.93	
DDC Control	0.00	690.04	11.61	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			:	3.00

JMCS JNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7	7604	<b>BUILDING NAME:</b>	GEN INST BLDG
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Building UA: 3,640 CONDITIONED SQFT: 13,493

## SYTEM INFORMATION -

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

## TYPICAL BUILDING INFORMATION

Catagory Number: Construction:	Use:	Occupancy HRS:	Occupancy Days:
21 BRICK AND CMU	TRAINING	0700-2100	M-F

Weeks of Winter: 32
Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	. 0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	23	23	23	23	23	0

## <u>INPUTS</u>

Motor HP:	2.00
HP Effic:	0.71
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	877,000
BLR CAP OUTPUT (BTUH):	648,000

## HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,600	3,360
HTG HRS ON:	2,560	5,376
H/C HRS ON:	4,171	8,760
CLG HRS SAVED:	1,760	-
HTG HRS SAVED:	2,816	•
C/H HRS SAVED:	4,589	•

## CONSTANTS

21.1	HOAUHC:
. 34	HOAUH:
0	COAUHC:
0	COAUC:
17.3	HOAOHC:
27.9	HOAOH:
0.000885	COAOHC:
0.00234	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000207	ECC:
0.0000784	ECHC:
0.000221	NSUCHC:
0.000584	NSUCC:
0.0000919	DDCCHC:
0.000243	DDCCC:
30500	NSC:
31900	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BUILDING NAME: GEN INST BLDG BLDG: 7604

ENERGY CALCULATION SUMMARY

System Type: 1

System Name: Small hot water boiler

System Number: BLR-1

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr	<u>MH/yt</u>
Schedule ST/SP	0.00	4,734.05	0.00	
Opt ST/SP	0.00	512.74	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	5,246.80	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	4.97	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	5,246.80	4.97	4.00

	TYPICAL SYSTEM	I POINT A	ND COS	TSUMMA	¥RY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	O	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00
	TOTAL:	2	0	2	3	\$1,443.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7604	BUILDING NAME:	GEN INST BLDG
	Desiletina e 114 e	2010	CONDITIONED COST

Building UA: 3,640 CONDITIONED SQFT: 13,493

# SYTEM INFORMATION

System Type: 6

System Name: Small air cooled chiller

System Number: CH-1

## PYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
2	1 BRICK AND CMU	TRAINING	0700-2100	M-F

Weeks of Winter: 32 Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	7	7	7	7	7	0
REQ STOP:	0	23	23	23	23	15	0

0

#### **INPUTS** Motor HP: 2.00 HP Effic: 0.78 0.80 Load Factor: 0 CFM-HTG: CFM-CLG: 0 %OA: 0% %Area: 0% CHILLER CAP (TONS): 70 KW-TON: 1.10 **BLR CAP INPUT (BTUH):** 0

BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,440	3,360
HTG HRS ON:	2,304	5,376
H/C HRS ON:	3,754	8,760
CLG HRS SAVED:	1,920	
HTG HRS SAVED:	3,072	•
C/H HRS SAVED:	5,006	•

	CONSTANTS
21.1	HOAUHC:
34	HOAUH:
0	COAUHC:
0	COAUC:
17.3	НОАОНС:
27.9	НОАОН:
0.000885	COAOHC:
0.00234	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000207	ECC:
0.0000784	ECHC:
0.000221	NSUCHC:
0.000584	NSUCC:
0.0000919	DDCCHC:
0.000243	DDCCC:
30500	NSC:
31900	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 16-Sep-95

PREPARED BY: AJN/CWW

LOCATION: FT. RILEY, KS

BUILDING NAME: GEN INST BLDG

ENERGY CALCULATION SUMMARY

System Type: 6

BLDG: 7604

System Name: Small air cooled chiller

<u>kWyr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
0.00	2,938.09	0.00	
0.00	466.73	0.00	
0.00	0.00	0.00	
1.17	0.00	0.00	
0.00	0.00	0.00	
1.17	3,404.82	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	1,225.00	0.00	
0.00	0.00	0.00	
58.91	0.00	0.00	
			4.00
	0.00 0.00 0.00 1.17 0.00 1.17 0.00 0.00 0.00 0.00 0.00 0.00	0.00         2,938.09           0.00         466.73           0.00         0.00           1.17         0.00           0.00         0.00           1.17         3,404.82           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         1,225.00           0.00         0.00	0.00         2,938.09         0.00           0.00         466.73         0.00           0.00         0.00         0.00           1.17         0.00         0.00           0.00         0.00         0.00           1.17         3,404.82         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         1,225.00         0.00           0.00         0.00         0.00

MCS NCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	0	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7604	BUILDING NAME:	GEN INST BLDG	
	Building UA:	3,640	CONDITIONED SQFT:	13,493

# SYTEM INFORMATION

System Type:	26
System Name:	Pump
System Number:	HWP-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
21	BRICK AND CMU	TRAINING	0700-2100	M-F
Weeks of	Winter:	32		
Weeks of Su	ımmer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	. 7	7	7	7	7	0
REQ STOP:	0	23	23	23	23	23	0

	200000000000000000000000000000000000000
Motor HP:	2.00
HP Effic:	0.78
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,600	3,360
HTG HRS ON:	2,560	5,376
H/C HRS ON:	4,171	8,760
CLG HRS SAVED:	1,760	
HTG HRS SAVED:	2,816	5
C/H HRS SAVED:	4,589	<u>.</u>

21.1
34
0
0
17.3
27.9
0.000885
0.00234
0.17
0.17
0.000207
0.0000784
0.000221
0.000584
0.0000919
0.000243
30500
31900
305
17.5
0
5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7604 BUILDING NAME: GEN INST BLDG

											)]						

System Type: 26
System Name: Pump
System Number: HWP-1

FUNCTION	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	4,309.20	0.00	
Opt ST/SP	0.00	466.73	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	4,775.93	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.00	4,775.93	0.00	3.00

UMCS FUNCTN NO.	TYPICAL SYSTEM  UMCS APPLICATION	DO	AQ	T SUMM/ DI POINTS	ARY AI POINTS	COST
24	Scheduled start/stop control - Pump; Optimum start/stop - Pump; Demand limiting - Pump	1	0	1	0	\$386.00
	TOTAL:	1	0	1	0	\$386.00

# BUILDING 7606 ENLISTED PERSONNEL DINING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7606	BUILDING NAME:	ENL PERS DIN
DLDG.	7000	DUILDING NAME.	LINE LEVO DIIA

**Building UA:** 2,454 CONDITIONED SQFT: 13,493

#### SYTEM INFORMATION

System Type: 11

System Name: Variable Air Volume air handling unit

System Number: AHU-1

## PYPICAL EUILDING NEORMATION

Construction: Use: Catagory Number: Occupancy HRS: Occupancy Days: 11 BRICK AND CMU MESS HALL - DINING AREA 0600-2000 M-F; SAT-SUN

Weeks of Winter: 32 Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

SUN: MON: TUE: FRI: SAT: WED: THUR: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 5 5 5 **REQ START:** 6 5 5 6 **REQ STOP:** 24 24 24 24 24 24 24

# INPUTS

Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	7,000
CFM-CLG:	7,000
%OA:	30%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

		PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	-
HTG HRS SAVED:	1,184	•
C/H HRS SAVED:	1,929	-

## **CONSTANTS**

HOAUHC:	28.4
HOAUH:	45.6
COAUHC:	0.000623
COAUC:	0.00165
HOAOHC:	33.9
HOAOH:	54.4
COAOHC:	0.0006483
COAOC:	0.00171
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0.000208
ECHC:	0.0000788
NSUCHC:	0.000261
NSUCC:	0.000691
DDCCHC:	0.00018
DDCCC:	0.000476
NSC:	57200
DDCH:	22500
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

HOVIIHC.

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7606 BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type: 11

System Name: Variable Air Volume air handling unit

<b>yr</b>	<u> Btu/yr                                     </u>	kWh/yr	<u>kWiyr</u>	FUNCTION
3	115.06	6,896.48	0.00	Schedule ST/SP
	0.00	691.23	0.00	Opt ST/SP
	0.00	0.00	0.00	Duty Cycle
	0.00	0.00	4.62	Demand Limit
	49.13	3,524.80	0.00	Night Setback
	164.19	11,112.52	4.62	Sub Total
	0.00	3,767.82	0.00	Economizer
	18.19	399.03	0.00	Ventilation/Recirculation
	19.33	8,606.70	0.00	DDC Control
	0.00	0.00	0.00	HW OA Reset
	0.00	0.00	0.00	Chilled Water Reset
	0.00	0.00	0.00	Condenser Water Reset
	0.00	0.00	0.00	Chiller Demand Limit
5.00	:	i	:	
	0.00	0.00	0.00 4.62	

TYPICAL SYSTEM POINT AND COST SUMMARY							
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST	
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	O	1	\$348.00	
32	Direct digital control - VAV AHU	0	3	0	11	\$3,695.00	
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00	
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00	
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00	
	TOTAL:	1	4	1	14	\$4,826.00	

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7606 BUIL	DING NAME:	<b>ENL PERS DIN</b>
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Building UA: 2,454 CONDITIONED SQFT: 13,493

## SYTEM INCORMATION

System Type: 11

System Name: Variable Air Volume air handling unit

System Number: AHU-2

# TYPICAL BUILDING INFORMATION Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days: 11 BRICK AND CMU MESS HALL - DINING AREA 0600-2000 M-F; SAT-SUN Weeks of Winter: 32 Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

<u>INPUTS</u>	
Motor HP:	3.00
HP Effic:	0.79
Load Factor:	0.80
CFM-HTG:	7,250
CFM-CLG:	7,250
%OA:	30%
%Area:	35%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	1  -
HTG HRS SAVED:	1,184	-
C/H HRS SAVED:	1,929	-

	<u>CONSTANTS</u>
28.4	HOAUHC:
45.6	HOAUH:
0.000623	COAUHC:
0.00165	COAUC:
33.9	HOAOHC:
54.4	НОАОН:
0.0006483	COAOHC:
0.00171	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0.000208	ECC:
0.0000788	ECHC:
0.000261	NSUCHC:
0.000691	NSUCC:
0.00018	DDCCHC:
0.000476	DDCCC:
57200	NSC:
22500	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7606 BUILDING NAME: ENL PERS DIN

# **ENERGY CALCULATION SUMMARY**

System Type: 11

System Name: Variable Air Volume air handling unit

FUNCTION	kW/yr	kWh/yr	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	6,986.63	119.17	
Opt ST/SP	0.00	691.23	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	4.62	0.00	0.00	
Night Setback	0.00	3,650.69	49.13	
Sub Total	4.62	11,328.55	168.30	
Economizer	0.00	3,902.39	0.00	
Ventilation/Recirculation	0.00	413.28	18.84	
DDC Control	0.00	8,914.08	19.33	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,				5.00
Maintenance, Run Time, and Safety Alarms				/
TOTAL	4.62	24,558.30	206.47	5.00

TYPICAL SYSTEM POINT AND COST SUMMARY UMCS						
FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
32	Direct digital control - VAV AHU	0	3	0	11	\$3,695.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
40	Maintenance (filter) alarm - AHU	0	0	1	0	\$112.00
	TOTAL:	1	4	1	14	\$4,826.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 09-Dec-95

13,493

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG: 7606 BUILDING NAME: ENL PERS DIN

Duilding HA

Building UA: 2,454 CONDITIONED SQFT:

SYTEM INFORMATION"

System Type: 3

System Name: Small steam boiler

System Number: BLR-1

## TYPICAL BUILDING INFORMATION

Catagory Number: Construction: Use: Occupancy HRS: Occupancy Days:

12 BRICK AND CMU MESS HALL - KITCHEN ARE 0500-2400 M-F; SAT-SUN

Weeks of Winter: 32
Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

SUN: MON: TUE: WED: THUR: FRI: SAT: PRES START: 0 0 0 0 0 0 0 PRES STOP: 24 24 24 24 24 24 24 **REQ START:** 0 0 0 0 0 0 0 **REQ STOP:** 24 24 24 24 24 24 24

neuts shi =	124
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	8,625,000
BLR CAP OUTPUT (BTUH):	6,900,000

#### REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 3,360 3,360 HTG HRS ON: 5,376 5,376 H/C HRS ON: 8.760 8,760 **CLG HRS SAVED:** 0 HTG HRS SAVED: 0 C/H HRS SAVED: 0

	<u>CONSTANTS</u>
0	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	НОАОН:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0	NSUCHC:
0	NSUCC:
0.00000209	DDCCHC:
0.00000552	DDCCC:
992000	NSC:
9640	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

DATE: 09-Dec-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7606	BUILDING NAME:	<b>ENL PERS DIN</b>
ENE	RGY CALCULAT	ION SUMMA

 System Type:
 3

 System Name:
 Small steam boiler

 System Number:
 BLR-1

<u>FUNCTION</u>	kW/yr	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms		:	4.00
TOTAL	0.00	0.00	0.00 4.00

	TYPICAL SYSTE	M POINT A	ND COST	SUMMA	RY	
UMCS FUNCT		DO 🐬	AO	DI	ΑI	COST
: NO.		POINTS	POINTS	POINTS	POINTS	
7	Steam Boiler Monitoring	1	0	3	1	\$1,015.00
	TOTAL:	4	0	3	-1	\$1,015.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #:** DACA 01-94-D-0033

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

LOCATION: FT. RILEY, KS

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7606	BUILDING NAME:	ENL PERS DIN	
	Building UA:	2,454	CONDITIONED SQFT:	13,493

SYTEM INFORMATION	
System Type:	6
System Name:	Small air cooled chiller
System Number:	CH-1

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1	1 BRICK AND CMU		MESS HALL - DINING AREA	0600-2000	M-F; SAT-SUN
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

PRES START:         0         0         0         0         0         0           PRES STOP:         24         24         24         24         24         24         24         24         24         24         24         25         26		SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
	PRES START:	0	0	0	0	0	0	0
<b>REQ START:</b> 6 5 5 5 5	PRES STOP:	24	24	24	24	24	24	24
	REQ START:	6	5	5	5	5	5	6

<u>INPUTS</u>	
Motor HP:	5.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	70
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	i.
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	•

<u>NSTANTS</u>	
HOAUHC:	28.
HOAUH:	45.
COAUHC:	0.00062
COAUC:	0.0016
HOAOHC:	33.
HOAOH:	54.
COAOHC:	0.000648
COAOC:	0.0017
DC DUTY:	0.1
DC DEMAND:	0.1
ECC:	0.00020
ECHC:	0.000078
NSUCHC:	0.00026
NSUCC:	0.00069
DDCCHC:	0.0001
DDCCC:	0.00047
NSC:	5720
DDCH:	2250
OPT:	30
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7606 BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type: 6
System Name: Sma

System Name: Small air cooled chiller

<b>KWyr</b>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
0.00	2,706.08	0.00
0.00	1,115.34	0.00
0.00	0.00	0.00
2.80	0.00	0.00
0.00	0.00	0.00
2.80	3,821.42	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	1,225.00	0.00
0.00	0.00	0.00
58.91	0.00	0.00
		4.0
	0.00 0.00 0.00 2.80 0.00 2.80 0.00 0.00	0.00         2,706.08           0.00         1,115.34           0.00         0.00           2.80         0.00           0.00         0.00           2.80         3,821.42           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         1,225.00           0.00         0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setback - Chiller	1	0	1	O	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
42	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7606	BUILDING NAME:	ENL PERS DIN

Building UA: 2,454 CONDITIONED SQFT:

13,493

## MITENTINEORMATION T

System Type: 5

System Name: Steam to hot water converter

System Number: CV-1

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days
1	2 BRICK AND CMU	MESS HALL -	KITCHEN ARE 0500-2400	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0'	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

<u>NPUTS</u>	
Motor HP:	0.75
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Агеа:	17%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	2,000,000
BLR CAP OUTPUT (BTUH):	2,000,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	- I.
HTG HRS SAVED:	1,184	
C/H HRS SAVED:	1,929	-

	<u>INSTANTS</u>
, o	HOAUHC:
0	HOAUH:
0	COAUHC:
0	COAUC:
0	HOAOHC:
0	HOAOH:
0	COAOHC:
0	COAOC:
0.17	DC DUTY:
0.17	DC DEMAND:
0	ECC:
0	ECHC:
0	NSUCHC:
0	NSUCC:
0.00000209	DDCCHC:
0.00000552	DDCCC:
992000	NSC:
9640	DDCH:
305	OPT:
17.5	CHWR:
0	CNWR:
5.67	OAR:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG:	7606	BUILDING NAME:	ENL PERS DIN

# ENERGY CALCULATION SUMMARY

System Type: 5

System Name: Steam to hot water converter

System Number: CV-1

FUNCTION -	- <u>kW/yr</u>	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	802.97	0.00	
Opt ST/SP	0.00	206.85	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	0.00	
Sub Total	0.00	1,009.81	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.00	
HW OA Reset	0.00	0.00	11.34	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring,	P. A. C. C. C. C. C. C. C. C. C. C. C. C. C.			3.00
Maintenance, Run Time, and Safety Alarms				/
TOTAL	0.00	1,009.81	11.34	3.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
8	Scheduled start/stop control - STM- HW Cnvrtr; Optimum start/stop control - STM-HW Cnvrtr; Night setback - STM-HW Cnvrtr	1	0	1	0	\$386.00
9	Hot water reset - STM-HW Converter	0	1	0	3	\$1,109.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

EMC NO: 1406-001

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7606	BUILDING NA	ME: ENL PERS DIN	
	Building UA:	2,454	CONDITIONED SQFT:	13,493
SYTEM	UNFORMATION	yeshi i a saka sa		
	System Type:	17		## 5 - 1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1
	System Name:	Heating and Ventilating Unit with Ret	turn Fa	
	System Number:	HRU-1		

TYPICAL BUILD	ING INFORMAT	ION-		An an artist of the second of	and market
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
1	2 BRICK AND CMU		MESS HALL - KIT	CHEN ARE 0500-2400	M-F; SAT-SUN
Weeks of	Winter:	32			
Weeks of S	ummer:	20			

SYSTEM OPERA	<u> TING S</u>	<u>CHEDUI</u>	£				
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

<u>NPUTS</u>	
Motor HP:	8.00
HP Effic:	0.82
Load Factor:	0.80
CFM-HTG:	11,400
CFM-CLG:	0
%OA:	100%
%Area:	20%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	ji
HTG HRS SAVED:	1,184	Ē
C/H HRS SAVED:	1,929	)

CONSTANTS	
HOAUHC:	. 0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0
NSUCC:	0
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7606 BUILDING NAME: ENL PERS DIN

ENERGY CALCULATION SUMMARY

System Type: 17
System Name: Heating and Ventilating Unit with Return Fa

EUNCTION	- <u>kWlyr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	6,927.56	0.00	
Opt ST/SP	0.00	1,784.55	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	146.06	
Sub Total	0.00	8,712.11	146.06	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00.	1.42	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time,		:		4.0
and Safety Alarms TOTAL	0.00	8,712.11	147.48	

UMCS FUNCTN NO.	TYPICAL SYSTEM - UMCS APPLICATION	POINT A DO POINTS	AO	T SUMMA DI POINTS	AT POINTS	COST
	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
	TOTAL:	2	2	0	5	\$1,782.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #:** DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

**DATE**: 16-Sep-95

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7606	BUILDING NAME	E ENL PERS DIN	
	Building UA:	2,454	CONDITIONED SQFT:	13,493

# SYTEM INFORMATION

System Type: 17

System Name: Heating and Ventilating Unit with Return Fa

System Number: HRU-2

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	2 BRICK AND CMU		CHEN ARE 0500-2400	M-F; SAT-SUN
Weeks of	Winter:	32		
Weeks of S	ummer:	20		

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	6	5	5	5	5	5	6
REQ STOP:	24	24	24	24	24	24	24

Motor HP:	2.50
HP Effic:	0.74
Load Factor:	0.80
CFM-HTG:	3,600
CFM-CLG:	0
%OA:	100%
%Area:	10%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
LR CAP OUTPUT (BTUH):	0

	REQUIRED	PRESENT
	HR/YR	HR/YR
CLG HRS ON:	2,620	3,360
HTG HRS ON:	4,192	5,376
H/C HRS ON:	6,831	8,760
CLG HRS SAVED:	740	- )
HTG HRS SAVED:	1,184	•
C/H HRS SAVED:	1,929	

<u>NSTANTS</u>	
HOAUHC:	
HOAUH:	
COAUHC:	-
COAUC:	(
HOAOHC:	
HOAOH:	
COAOHC:	
COAOC:	(
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	(
ECHC:	(
NSUCHC:	(
NSUCC:	(
DDCCHC:	0.00000209
DDCCC:	0.00000552
NSC:	992000
DDCH:	9640
OPT:	305
CHWR:	17.
CNWR:	
OAR:	5.6

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7606 BUILDING NAME: ENL PERS DIN

ENERGY CALGULATION SUMMARY

System Type: 17

System Name: Heating and Ventilating Unit with Return Fa

FUNCTION: 1	kW/yr	kWh/yr	MBtu/yr	MH/yr
Schedule ST/SP	0.00	2,387.20	0.00	
Opt ST/SP	0.00	614.95	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	
Night Setback	0.00	0.00	73.03	
Sub Total	0.00	3,002.15	73.03	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	0.00	0.71	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				4.00
TOTAL	0.00	3,002.15	73.74	4.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
19	Scheduled start/stop control - AHU w/ RF; Optimum start/stop - AHU w/ RF; Demand limiting - AHU w/ RF; Duty Cycling - AHU w/ RF	2	0	0	2	\$697.00
30	Direct digital control - H&V Unit	0	1	0	3	\$813.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00

# BUILDING 7608 ADMINISTRATION & SUPPLY BUILDING

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

**DATE:** 16-Sep-95 PREPARED BY: AJN/CWW

**ENERGY CALCULATION PARAMETERS** 

BLDG:	7608	BUILDING NAME:	ADMIN & SUPPORT BLDG
			ADMING COLL OLL BEDG

**Building UA:** 4,753 CONDITIONED SQFT: 13,520

## SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-1

## TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
3		ADMIN & SUPPLY	0700-1600	M-F

Weeks of Winter: 32 Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	· · · · · · · · · · · · · · · · · · ·

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	- 
HTG HRS SAVED:	3,616	• 
C/H HRS SAVED:	5,892	•

CONSTANTS	
HOAUHC:	0
HOAUH:	. 0
COAUHC:	0
COAUC:	0
HOAOHC:	0
ноаон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7608 BUILDING NAME: ADMIN & SUPPORT BLDG

# ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	<u>MBtu/yr</u> <u>MH/y</u>	r
Schedule ST/SP	0.00	1,021.79	0.00	ASSESS OF A T-17 OF A T-17
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.35	0.00	0.00	
Night Setback	0.00	1,270.39	0.00	
Sub Total	0.35	2,430.08	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0.00	0.00	0.00	
DDC Control	0.00	51.49	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	0.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	-
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.0
TOTAL	0.35	2,481.58	0.00	3.0

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
C lii	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand miting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27 D	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
	Outside air damper ventilation and ecirculation control - AHU	0	1	0	0	\$272.00
	Outside air damper economizer ontrol - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7608	BUILDING NAME	ADMIN & SUPPORT BLDG	
	Building UA:	4,753	CONDITIONED SQFT:	13,520

## SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-2

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks o	f Winter:	32			
Weeks of S	Summer:	20			

## SYSTEM OPERATING SCHEDULE

	"ŞUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

0

#### **INPUTS** Motor HP: 0.50 HP Effic: 0.66 Load Factor: 0.80 CFM-HTG: 0 CFM-CLG: 940 %OA: 20% 0% CHILLER CAP (TONS): 0 KW-TON: 0.00 BLR CAP INPUT (BTUH): 0

# HOURS CALCULATIONS

BLR CAP OUTPUT (BTUH):

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:		
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	- !
HTG HRS SAVED:	3,616	1
C/H HRS SAVED:	5,892	7

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7608 BUILDING NAME: ADMIN & SUPPORT BLDG

# ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr MH/yr
0.00	1,021.79	0.00
0.00	137.90	0.00
0.00	0.00	0.00
0.35	0.00	0.00
0.00	1,270.39	0.00
0.35	2,430.08	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	51.49	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		3
	0.00 0.00 0.00 0.35 0.00 0.35 0.00 0.00 0.00 0.00 0.00	0.00         1,021.79           0.00         137.90           0.00         0.00           0.35         0.00           0.35         2,430.08           0.00         0.00           0.00         0.00           0.00         0.00           0.00         51.49           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

MCS NCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE:** 16-Sep-95

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7608	BUILDING NAME:	ADMIN & SUPPORT BLDG	
	Building UA:	4,753	CONDITIONED SQFT:	13,520

## SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-3

TYPICAL BUILD	ING INFORMATIO	N .			
Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

## SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	. 0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

#### HOURS CALCULATIONS REQUIRED PRESENT HR/YR HR/YR CLG HRS ON: 1,100 3,360 HTG HRS ON: 1,760 5,376 H/C HRS ON: 2,868 8,760 CLG HRS SAVED: 2,260 HTG HRS SAVED: 3,616 C/H HRS SAVED: 5,892

CONSTANTS	
HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
HOAOH:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7608 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

<u>kW/yr</u>	<u>kWh/yr</u>	<u>MBtu/yr</u> <u>MH/yr</u>
0.00	1,021.79	0.00
0.00	137.90	0.00
0.00	0.00	0.00
0.35	0.00	0.00
0.00	1,270.39	0.00
0.35	2,430.08	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	51.49	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
0.00	0.00	0.00
		3.0
	0.00 0.00 0.35 0.00 0.35 0.00 0.00 0.00	0.00         1,021.79           0.00         137.90           0.00         0.00           0.35         0.00           0.35         2,430.08           0.00         0.00           0.00         0.00           0.00         51.49           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00

	TYPICAL SYSTEM	POINT A	ND COS	T SUMMA	ARY	
UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00
	TOTAL:	1	3	0	6	\$2,116.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

**DATE**: 16-Sep-95

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7608	BUILDING NAME:	ADMIN & SUPPORT BLDG

**Building UA:** CONDITIONED SQFT: 13,520 4,753

## SYTEM INFORMATION

System Type: 15

System Name: Small Single Zone air handling unit

System Number: AHU-4

# TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
	2148			·

Weeks of Winter: 32 Weeks of Summer: 20

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

HP Effic:	0.66
Motor HP:	0.50
INPUIS	

Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Агеа:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00

BLR CAP INPUT (BTUH): BLR CAP OUTPUT (BTUH):

## **HOURS CALCULATIONS**

HR/YR	HR/YR
1,100	3,360
1,760	5,376
2,868	8,760
2,260	
3,616	•
5,892	
	HR/YR 1,100 1,760 2,868 2,260 3,616

## **CONSTANTS**

COAUHC: 0
COAUC: 0
HOAOHC: 0
HOAOH: 0
COAOHC: 0
COAOC: 0
DC DUTY: 0.17
DC DEMAND: 0.17
ECC: 0
ECHC: 0
NSUCHC: 0.000226
NSUCC: 0.000598
DDCCHC: 0.0000188
DDCCC: 0.0000498
NSC: 93100
<b>DDCH</b> : 29900
<b>OPT</b> : 305
CHWR: 17.5
CNWR: 0
OAR: 5.67

HOAUHC:

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7608 BUILDING NAME: ADMIN & SUPPORT BLDG

# ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	1,021.79	0.00
Opt ST/SP	0.00	137.90	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.35	0.00	0.00
Night Setback	0.00	1,270.39	0.00
Sub Total	0.35	2,430.08	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	51.49	0.00
HW OA Reset	0.00	0.00	0.00
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			3.00
TOTAL	0.35	2,481.58	0.00

UMCS FUNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	0	0	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7608	BUILDING NAME:	ADMIN & SUPPORT BLDG	
	Building UA:	4,753	CONDITIONED SQFT:	13,520

# SYTEM INFORMATION System Type: 15 System Name: Small Single Zone air handling unit

	1	-	
System Number:			

Catagory Number:	Construction:		Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU		ADMIN & SUPPLY	0700-1600	M-F
Weeks of	f Winter:	32			
Weeks of S	Summer:	20			

# SYSTEM OPERATING SCHEDULE

	,ŞUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	. 0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

Motor HP:	0.50
HP Effic:	0.66
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	940
%OA:	20%
%Area:	0%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
RI R CAP OUTPUT (RTUH).	······

HOAUHC:	0
HOAUH:	0
COAUHC:	0
COAUC:	0
HOAOHC:	0
НОАОН:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0

OAR:

5.67

**CONSTANTS** 

# HOURS CALCULATIONS

	PRESENT HR/YR
1,100	3,360
1,760	5,376
2,868	8,760
2,260	-
3,616	•
5,892	•
	1,100 1,760 2,868 2,260 3,616

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

**DATE**: 16-Sep-95

PREPARED BY: AJN/CWW

BLDG: 7608 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 15

System Name: Small Single Zone air handling unit

<u>kW/yr</u>	kWh/yr	MBtu/yr N	<u>ЛН/уг</u>
0.00	1,021.79	0.00	PPALITY N. SEDANIERAK SELLELAN
0.00	137.90	0.00	
0.00	0.00	0.00	
0.35	0.00	0.00	
0.00	1,270.39	0.00	
0.35	2,430.08	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	51.49	0.00	
0.00	0.00	0.00	·
0.00	0.00	0.00	
0.00	0.00	0.00	
0.00	0.00	0.00	
			3.
	0.00 0.00 0.00 0.35 0.00 0.35 0.00 0.00 0.00 0.00 0.00	0.00         1,021.79           0.00         137.90           0.00         0.00           0.35         0.00           0.00         1,270.39           0.35         2,430.08           0.00         0.00           0.00         0.00           0.00         51.49           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00           0.00         0.00	0.00         1,021.79         0.00           0.00         137.90         0.00           0.00         0.00         0.00           0.35         0.00         0.00           0.00         1,270.39         0.00           0.35         2,430.08         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         51.49         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00           0.00         0.00         0.00

UMCS UNCTN NO.	UMCS APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
18	Scheduled start/stop control - AHU; Optimum start/stop - AHU; Demand limiting - AHU; Duty Cycling - AHU; Night setback - AHU	1	O	O	1	\$348.00
27	Direct digital control - Small SZ AHU	0	2	0	3	\$1,097.00
33	Outside air damper ventilation and recirculation control - AHU	0	1	0	0	\$272.00
36	Outside air damper economizer control - AHU	0	0	0	2	\$399.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

CLIENT CNTRCT #: DACA 01-94-D-0033 LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

**DATE**: 16-Sep-95

**ENERGY CALCULATION PARAMETERS** 

BLDG: 7608			В	UILDING	NAME:	ADMIN	& SUPPORT BLD	OG .
В	uilding UA:		4,7	53		CON	DITIONED SQFT:	13,520
SYTEM INFO	RMATION							
Sy	stem Type: 1	######################################	**************************************	and a second second second second second second second second second second second second second second second	CARCASTANCE OF PROPERTY.	And the second s		for an efficiency of the second secon
Sys	stem Name: S	mall hot w	ater boiler				,	
Syste	m Number: B	LR-1						
TYPICAL BUI	I DING INE	OPMAT	ion.					
Catagory Numbe		de construire de la con	<u>ION</u>	Use:			Occupancy HRS	Occupancy Days:
	3 BRICK A			ADMIN	& SUPPLY	<u> </u>	0700-1600	M-F
Week	s of Winter:		32					
Weeks	of Summer:		20					
SYSTEM OPE	RATING S	CHEDUI	<b>E</b> MA					
	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:	
PRES STAR	T: 0	0	0	0	0	0	0	
PRES STO	P: 24	24	24	24	24	24	24	
REQ STAR	T: 0	6	6	6	6	6	0	
	P: 0	17	17	17	17	17		

INPUTS	
Motor HP:	0.00
HP Effic:	0.00
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	1,000,000
BLR CAP OUTPUT (BTUH):	800,000

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED	2,260	_
HTG HRS SAVED	3,616	- i
C/H HRS SAVED:	5,892	<del>-</del> !

CONSTANTS		
	HOAUHC:	0
	HOAUH:	0
AND THE RESERVE AND THE PERSON OF THE PERSON	COAUHC:	0
	COAUC:	0
A	HOAOHC:	0
	НОАОН:	0
	COAOHC:	0
	COAOC:	0
	DC DUTY:	0.17
DC	DEMAND:	0.17
	ECC:	0
	ECHC:	0
	NSUCHC:	0.000226
	NSUCC:	0.000598
	DDCCHC:	0.0000188
	DDCCC:	0.0000498
	NSC:	93100
	DDCH:	29900
	OPT:	305
	CHWR:	17.5
	CNWR:	0
	OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

LOCATION: FT. RILEY, KS

EMC NO: 1406-001

DATE: 16-Sep-95
PREPARED BY: AJN/CWW

BLDG: 7608 BUILDING NAME: ADMIN & SUPPORT BLDG

# ENERGY CALCULATION SUMMARY

System Type: 1
System Name: Small hot water boiler
System Number: BLR-1

<u>FUNCTION</u>	kW/yr	kWh/yr	<u>MBtu/yr</u> <u>MH/yr</u>
Schedule ST/SP	0.00	.00	0.00
Opt ST/SP	0.00	0.00	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.00	0.00	0.00
Night Setback	0.00	0.00	0.00
Sub Total	0.00	0.00	0.00
Economizer	0.00	0.00	0.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	5.67
Chilled Water Reset	0.00	0.00	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	0.00	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.00
TOTAL	0.00	0.00	5.67 4.0

IMCS INCTN	UMCS APPLICATION -	DO	AO	DI	ΑI	COST
NO.		POINTS	POINTS	POINTS	POINTS	
1	Scheduled start/stop control - HW Boiler; Optimum start/stop control - HW Boiler; Night setback - HW Boiler	2	0	0	0	\$277.00
2	Hot water reset - HW Boiler	0	0	0	3	\$836.00
4	Alarms - HW Boiler	0	0	2	0	\$330.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

**DATE**: 16-Sep-95

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7608	BUILDING NAME:	ADMIN & SUPPORT BLDG	3
	Building UA:	4,753	CONDITIONED SQFT:	13,520

# SYTEM INFORMATION:

System Type: 6 System Name: Small air cooled chiller

System Number: CH-1

#### TYPICAL BUILDING INFORMATION Occupancy HRS: Occupancy Days: Catagory Number: Construction: Use: **ADMIN & SUPPLY** 0700-1600 M-F 3 BRICK AND CMU

Weeks of Winter: 32 Weeks of Summer: 20

## SYSTEM OPERATING SCHEDULE

***************************************	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	· 0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

<u>INPUTS</u>	
Motor HP:	1.00
HP Effic:	0.69
Load Factor:	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	0%
CHILLER CAP (TONS):	15
KW-TON:	1.10
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

# HOURS CALCULATIONS

	RESENT IR/YR
1,100	3,360
1,760	5,376
2,868	8,760
2,260	
3,616	
5,892	
	HR/YR H 1,100 1,760 2,868 2,260 3,616

<u>CONSTANTS</u>	
HOAUHC:	0
HOAUH:	
COAUHC:	0
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	0.0000188
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP. FEASIBILITY STUDY FOR INSTALLATION OF UMCS

CLIENT CNTRCT #: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LOCATION: FT RILEY KS

PREPARED BY: AJN/CWW

BLDG: 7608 BUILDING NAME: ADMIN & SUPPORT BLDG

ENERGY CALCULATION SUMMARY

System Type: 5

Small air cooled chiller System Name:

System Number: CH-1

<u>FUNCTION</u>	<u>kW/yr</u>	kWh/yr	MBtu/yr MH/yr
Schedule ST/SP	0.00	1,949.09	0.00
Opt ST/SP	0.00	263.04	0.00
Duty Cycle	0.00	0.00	0.00
Demand Limit	0.66	0.00	0.00
Nignt Setback	0.00	0.00	0.00
Sub Total	0.66	2,212.13	0.00
Economizer	0.00	0.00	C.00
Ventilation/Recirculation	0.00	0.00	0.00
DDC Control	0.00	0.00	0.00
HW OA Reset	0.00	0.00	G.00
Chilled Water Reset	0.00	262.50	0.00
Condenser Water Reset	0.00	0.00	0.00
Chiller Demand Limit	12.62	0.00	0.00
Remote Monitoring, Maintenance, Run Time, and Safety Alarms			4.00
TOTAL	13.28	2,474.63	0.00 4.00

JMCS JNCTN NO.	UMCs APPLICATION	DO POINTS	AO POINTS	DI POINTS	AI POINTS	COST
10	Scheduled start/stop control - Chiller; Optimum start/stop control - Chiller; Demand limiting - Chiller; Night Setbalk - Chiller	1	0	1	O	\$386.00
11	Chilled water reset - Small Air Cooled Chiller	0	0	0	2	\$664.00
16	Alarms - Chiller	0	0	2	0	\$281.00
<b>4</b> 2	Chiller demand limiting - Small Air Cooled Chiller	1	0	0	0	\$150.00

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

EMC NO: 1406-001

**CLIENT CNTRCT #: DACA 01-94-D-0033** 

**DATE:** 16-Sep-95

LOCATION: FT. RILEY, KS

PREPARED BY: AJN/CWW

# **ENERGY CALCULATION PARAMETERS**

BLDG:	7608	BUILDING NAME:	ADMIN & SUPPORT BLDG	
	Desilation IIAs'	A 752	CONDITIONED COET.	42

Building UA: 4,75

CONDITIONED SQFT:

13,520

## SYTEM INFORMATION

System Type: 25

System Name: Hot water radiation pump

System Number: RAD-1

# TYPICAL BUILDING INFORMATION

Catagory Number:	Construction:	Use:	Occupancy HRS:	Occupancy Days:
	3 BRICK AND CMU	ADMIN & SUPPLY	0700-1600	M-F
Wooks of		22		

Weeks of Winter: 32
Weeks of Summer: 20

# SYSTEM OPERATING SCHEDULE

	SUN:	MON:	TUE:	WED:	THUR:	FRI:	SAT:
PRES START:	0	0	0	0	0	0	0
PRES STOP:	24	24	24	24	24	24	24
REQ START:	0	6	6	6	6	6	0
REQ STOP:	0	17	17	17	17	17	0

#### <u>INPUTS</u>

Motor HP:	0.50
HP Effic:	0.69
Load Factor.	0.80
CFM-HTG:	0
CFM-CLG:	0
%OA:	0%
%Area:	100%
CHILLER CAP (TONS):	0
KW-TON:	0.00
BLR CAP INPUT (BTUH):	0
BLR CAP OUTPUT (BTUH):	0

## HOURS CALCULATIONS

	REQUIRED HR/YR	PRESENT HR/YR
CLG HRS ON:	1,100	3,360
HTG HRS ON:	1,760	5,376
H/C HRS ON:	2,868	8,760
CLG HRS SAVED:	2,260	~ 
HTG HRS SAVED:	3,616	-
C/H HRS SAVED:	5,892	-

## CONSTANTS .

HOAUHC:	0
HOAUH:	. 0
COAUHC:	Ō
COAUC:	0
HOAOHC:	0
нолон:	0
COAOHC:	0
COAOC:	0
DC DUTY:	0.17
DC DEMAND:	0.17
ECC:	0
ECHC:	0
NSUCHC:	0.000226
NSUCC:	0.000598
DDCCHC:	188 כ-0.000
DDCCC:	0.0000498
NSC:	93100
DDCH:	29900
OPT:	305
CHWR:	17.5
CNWR:	0
OAR:	5.67

PROJECT NAME: EEAP, FEASIBILITY STUDY FOR INSTALLATION OF UMCS

**CLIENT CNTRCT #**: DACA 01-94-D-0033

EMC NO: 1406-001

**DATE**: 16-Sep-95

LÓCĂTION: FT. RILEY, KS

PREPARED BY: AJN/CWW

BLDG: 7608

BUILDING NAME: ADMIN & SUPPORT BLDG

# ENERGY CALCULATION SUMMARY

System Type:

System Name: Hot water radiation pump

System Number: RAD-1

<u>FUNCTION</u>	<u>kW/yr</u>	<u>kWh/yr</u>	MBtu/yr	<u>MH/yr</u>
Schedule ST/SP	0.00	1,634.87	0.00	
Opt ST/SP	0.00	137.90	0.00	
Duty Cycle	0.00	0.00	0.00	
Demand Limit	0.00	0.00	0.00	VI
Night Setback	0.00	· 0.00	0.00	
Sub Total	0.00	1,772.77	0.00	
Economizer	0.00	0.00	0.00	
Ventilation/Recirculation	0:00	0.00	0.00	
DDC Control	9.00	0.ŪO	0.00	
HW OA Reset	0.00	0.00	0.00	
Chilled Water Reset	. ύ.00	0.00	0.00	
Condenser Water Reset	0.00	0.00	0.00	
Chiller Demand Limit	0.00	0.00	0.00	
Remote Monitoring, Maintenance, Run Time, and Safety Alarms				3.00
TOTAL	0.02 S	1,712,74	0.00	3.0

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UMCS FUNCTI	UMCS APPLICATION	DO	ÄO	DΙ	ΑT	COST'
NO.		POINTS	POINTS		POINTS	
23	Scheduled start/stop control HW Pump; Optimum start/stop HW Pump; Night setback HW Pump	1	0	1	1	\$570.00
	TOTAL:	1	ø	1	71	\$570.00